



Anchorage School District

BETTYE DAVIS EAST ANCHORAGE HIGH SCHOOL SAFETY UPGRADES ACADEMIC AREA

**ITB 2024-811
ASD PROJECT No. 830717**

DATE ISSUED: February 20, 2024

TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>No. of Pages</u>
DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS		
00020	Invitation to Bid	2
00100	Instructions to Bidders	14
00200	Project Schedule Milestone Dates	2
00300	Bid Form	7
00420	Asbestos Abatement Subcontractor's Certificate of Insurance	1
00500	Owner - Contractor Agreement Form	3
00610	Bid Bond Form	3
00620	Performance Bond and Payment Bond	9
00630	Sample Forms and Certificates	40
00700	General Conditions of the Contract for Construction	66
00800	Supplementary General Conditions to the Contract for Construction	6
00820	Wage Rates	1
DIVISION 1 - GENERAL REQUIREMENTS		
01010	Summary of Work	4
01030	Bid Alternates	2
01031	Bid Allowances	1
01041	Project Coordination	2
01045	Cutting and Patching	3
01049	Mechanical & Electrical Coordinator	3
01050	Field Engineering	2
01060	Regulatory Requirements	1
01070	Abbreviations and Definitions	3
01090	Referenced Specifications and Standards	3
01120	Alteration Procedures	2
01200	Project Meetings	3
01300	Submittals	2
01311	Project Schedule	3
01340	Shop Drawings, Product Data and Samples	5
01370	Schedule of Values	2
01380	Construction Photographs	2
01400	Quality Control	9
01410	Testing Laboratory Services	3
01420	Special Inspections	3
01421	Structural Observation	2
01500	Temporary Facilities and Controls	4
01502	Maintenance of Traffic	1
01580	Project Sign	3
01600	Materials and Equipment	2
01610	Delivery, Storage and Handling	3
01630	Substitution and Product Option	3
01650	Starting of Systems	2
01651	System Commissioning	10
01700	Project Close-Out	3
01710	Cleaning	1
01720	Project Record Documents	3
01730	Operation and Maintenance Data	4
01750	Closeout Forms	16
01900	Utility Location Requirements	1
DIVISION 2 - SITEWORK		

TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>No. of Pages</u>
02 26 00	Hazardous Materials Assessment	249
02 41 19	Selective Demolition	3
02 82 33	Removal & Disposal of Asbestos Containing Materials	17
02 83 33	Removal & Disposal of Materials Containing Lead	13
02 84 18	Removal & Disposal of Chemical Hazards.....	10
DIVISION 5 – METALS		
05 12 00	Structural Steel Framing	4
05 31 00	Steel Decking.....	5
05 40 00	Cold-Formed Metal Framing.....	6
DIVISION 7 - THERMAL AND MOISTURE PROTECTION		
07 53 23	EPDM Membrane Roofing.....	11
07 62 00	Sheet Metal Flashing & Trim	6
07 76 16	Plaza Deck Roofing System	12
07 92 00	Joint Sealants	4
DIVISION 8 - DOORS AND WINDOWS		
08 11 13	Hollow Metal Doors & Frames.....	6
08 35 13	Accordion-Folding Fire Doors.....	4
08 43 12	Aluminum-Framed Storefronts	12
08 71 00	Door Hardware	9
08 80 00	Glazing.....	3
DIVISION 9 - FINISHES		
09 21 16	Gypsum Board Assemblies	4
09 30 00	Tiling	3
09 51 00	Acoustical Ceilings.....	4
09 65 00	Resilient Flooring	4
09 67 00	Fluid Applied Flooring	5
09 90 00	Painting & Coating	7
DIVISION 10 - SPECIALTIES		
10 21 13	Plastic Toilet Compartments.....	5
10 26 00	Wall Protection Panels.....	4
10 26 01	Corner Guards	2
10 28 00	Toilet Accessories.....	3
DIVISION 20 – MECHANICAL		
20 00 00	Mechanical General Requirements	13
20 05 05	Mechanical Demolition.....	4
20 05 29	Mechanical Hangers & Supports	8
20 05 48	Vibration & Seismic Control.....	8
20 05 53	Mechanical Identification	4
20 07 00	Mechanical Insulation	6

TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>No. of Pages</u>
DIVISION 21 – FIRE SUPPRESSION		
21 10 00	Water Based Fire Suppression Systems.....	17
DIVISION 22 – PLUMBING		
22 11 00	Domestic Water Piping and Specialties.....	7
22 13 00	Sanitary Waste and Vent Piping & Specialties.....	5
22 14 00	Storm Drainage Piping and Specialties.....	6
22 40 00	Plumbing Fixtures.....	6
DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)		
23 05 93	Testing, Adjusting, and Balancing.....	6
23 21 13	Hydronic Piping and Specialties.....	8
23 31 00	Ducts and Accessories.....	6
23 37 00	Air Outlets and Inlets.....	3
23 82 00	Terminal Heating and Cooling Units.....	5
DIVISION 26 – ELECTRICAL		
26 00 00	Electrical General Requirements.....	16
26 05 19	Low Voltage Electrical Power Conductors & Cables.....	5
26 05 26	Grounding and Bonding for Electrical Systems.....	3
26 05 29	Hangers and Supports for Electrical Systems.....	6
26 05 33	Raceway and Boxes for Electrical Systems.....	11
26 05 53	Identification for Electrical Systems.....	5
26 09 43	Network Lighting Controls.....	19
26 27 26	Wiring Devices.....	3
26 50 00	Lighting Fixtures.....	5
DIVISION 27 – COMMUNICATIONS		
27 20 10	Telecom Distribution System.....	14
DIVISION 28 – FIRE DETECTION		
28 46 00	Fire Detection & Alarm.....	22
EXHIBITS		
Exhibit A	Siemens Building Technologies.....	TBD
DRAWINGS		
G0.01	Cover Sheet	
G0.02	Code Plan	
G0.03	Construction Site Plan – Staging Plan	
H0.01	Hazards Abatement General & Sheet Notes	
H1.01	Hazards Abatement Academic Area Plan	
H1.02	Hazards Abatement Area E	
H1.03	Hazards Abatement Area F	

TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>No. of Pages</u>
HA1.01	Plaza Hazards Abatement	
HA2.01	Add Alt 2 Restrooms Hazards Abatement	
HA3.01	Add Alt 3 Hazards Abatement Lower Level	
HA3.02	Add Alt 3 Hazards Abatement Main Level	
HA3.03	Add Alt 3 Hazards Abatement Upper Level	
HA4.01	Add Alt 4 Storefront Hazards Abatement	
A0.01	Abbreviations & Symbols	
A0.02	Schedules & Assemblies	
AD1.01	Overall Floor Plan – Demo	
AD1.02	Floor Plan – Demo – Area E	
AD1.03	Floor Plan – Demo – Area F	
AD2.01	Overall Reflected Ceiling – Demo	
AD2.02	Reflected Ceiling – Demo – Area E	
AD2.03	Reflected Ceiling – Demo – Area E	
AD2.04	Reflected Ceiling Plan Area F	
AD5.01	Enlarged Drawings – Demo	
A1.01	Overall Floor Plan – New	
A1.02	Floor Plan – New – Area E	
A1.03	Floor Plan – New – Area F	
A2.01	Overall Reflected Ceiling Plan – New	
A2.02	Reflected Ceiling Plan – New – Area E	
A2.03	Reflected Ceiling Plan – New – Area F	
A5.01	Enlarged Drawings	
A7.01	Details	
AA1.01	Add Alt 1 – Plaza Repair	
AA1.02	Add Alt 1 – Plaza Repair Details	
AA2.01	Add Alt 2 – Enlarged Plans - Demo	
AA2.02	Add Alt 2 – Enlarged Plans	
AA2.03	Add Alt 2 – Interior Elevations	
AA2.04	Add Alt 2 – Interior Elevations	
AA4.01	Add Alt 4 – Storefront Replacement	
AA4.02	Add Alt 4 – Storefront Replacement Sections	
AA4.03	Add Alt 4 – Storefront Details	
S0.01	Structural General Notes & Abbreviations	
S1.01	Structural Details	
S2.01	Exterior Canopy Plans	
S2.02	Exterior Canopy Details	
M0.01	Legend & Abbreviations	
M0.02	Schedules	
M0.10	Overall Plan – Mechanical – Main Level	
M0.11	Overall Plan – Mechanical – Upper & Lower Levels	
MD1.01	Demolition Main Level – Mechanical – Area E	
MD1.02	Demolition Main Level – Mechanical – Area F	
M1.01	Main Level – Mechanical – Area E	
M1.02	Main Level – Mechanical – Area F	
M2.01	Add Alt 2 – Main Level – Plumbing – Enlarged	
M2.02	Add Alt 2 – Main Level – Plumbing – Enlarged	
M2.03	Add Alt 2 – Main Level – Plumbing – Enlarged	
M2.04	Add Alt 1 – Enlarged Plan Plaza	
M2.05	Fan Room Duct Repair	
M3.01	Mechanical Details	
M3.02	Reference Photos	
E0.01	Legend	

TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>No. of Pages</u>
E0.02	Lighting Fixture & Control Schedules	
E0.03	Panel Schedules	
E0.10	Overall Plans – Main Level	
E0.11	Overall Plans – Lower, Upper & Penthouse Levels	
E0.12	Main Level – RCP	
E0.13	Lower, Upper & Penthouse Level – RCP	
ED1.01	Floor Plan Main Level – Area E – Lighting – Demo	
ED1.02	Floor Plan Main Level – Area F – Lighting – Demo	
ED1.03	Floor Plan Main Level – Area E – Power & Special Systems – Demo	
ED1.04	Floor Plan Main Level – Area F – Power & Special Systems – Demo	
E1.01	Floor Plan Main Level – Area E – Lighting	
E1.02	Floor Plan Main Level – Area F – Lighting	
E1.03	Floor Plan Main Level – Area E – Power & Special Systems	
E1.04	Floor Plan Main Level – Area F – Power & Special Systems	
E2.00	Add Alt 1 – Enlarged Plan Plaza	

ELECTRICAL ADDITIVE ALTERNATE 3 DRAWINGS

ED2.01	Floor Plan Main Level – Area A – Special Systems – Demo
ED2.02	Floor Plan Main Level - Area B - Special Systems – Demo
ED2.03	Floor Plan Main Level – Area C – Special Systems – Demo
ED2.04	Floor Plan Main Level – Area D – Special Systems – Demo
ED2.05	Floor Plan Main Level – Area E – Special Systems – Demo
ED2.06	Floor Plan Main Level – Area F – Special Systems – Demo
ED2.07	Floor Plan Lower Level – Area A – Special Systems – Demo
ED2.08	Floor Plan Lower Level – Area B & F – Special Systems – Demo
ED2.09	Floor Plan Upper Level – Area C – Special Systems Demo
ED2.10	Floor Plan Upper Level – Area D – Special Systems Demo
E2.01	Floor Plan Main Level – Area A – Special Systems
E2.02	Floor Plan Main Level – Area B – Special Systems
E2.03	Floor Plan Main Level – Area C – Special Systems
E2.04	Floor Plan Main Level – Area D – Special Systems
E2.05	Floor Plan Main Level – Area E - Power & Special Systems
E2.06	Floor Plan Main Level – Area F – Power & Special Systems
E2.07	Floor Plan Lower Level – Area A – Special Systems
E2.08	Floor Plan Lower Level – Area B & F – Special Systems
E2.09	Floor Plan Upper Level – Area C – Special Systems
E2.10	Floor Plan Upper Level – Area D - Special Systems
ED3.01	Enlarged Plan Main Level – Fan Rooms – Demo
ED3.02	Enlarged Plans – Upper Level – Fan Rooms – Demo
ED3.03	Enlarged Plan Penthouse Level – Fan Rooms – Demo
E3.01	Enlarged Plan Main Level – Fan Rooms
E3.02	Enlarged Plans Upper Level – Fan Rooms
E3.03	Enlarged Plan Penthouse Level – Fan Rooms
E4.01	Diagram – Fire Alarm One-Line

INVITATION TO BID (ITB) NUMBER: 2024-811
Bettye Davis East Anchorage High School Safety Upgrades Academic Area

Sealed bids will be received in accordance with the time schedule shown below by the Anchorage School District, Purchasing Department, located at 4919 Van Buren Street Anchorage, Alaska 99517 for Bettye Davis East Anchorage High School Safety Upgrades Academic Area per the attached Instructions to Bidders, General Conditions, Technical Specifications, Drawings and Bid Form.

ESTIMATED CONSTRUCTION COST: Between \$5,000,000 - \$10,000,000

On-Site Pre-Bid Conference:	February 23, 2024 at 3:00 p.m. Local Time
Pre-Bid Conference:	February 27, 2024 at 11:00 a.m. Local Time
Bid Opening:	March 19, 2024 at 2:00 p.m. Local Time

At the above indicated time, the bids will be opened publicly and read. Bids received by the Purchasing Department after the time fixed for opening of the bids will not be considered. Time of receipt will be as determined by the time stamp at the Purchasing Department.

DOCUMENTS:

Prospective bidders may obtain copies of bidding documents at the Anchorage School District website <http://www.asdk12.org/depts/purchasing/PurchasingBids.aspx> Only electronic versions of this ITB are issued.

A copy of the current plan holder's list can be viewed at:
http://apps.asdk12.org/depts/purchasing/meeting/Plan_Holders/2024/811.xlsx

NOTICE TO BIDDERS:

A bid bond in the amount of five (5%) percent of the total amount of the base bid will be required (**cash, personal or business checks are unacceptable**). The successful Contractor shall be required to furnish 100 percent performance and payment bonds.

The Anchorage School District reserves the right to reject any and all bids, and to waive any informalities or irregularities in bidding procedures.

ON-SITE VISIT AND PRE-BID CONFERENCE:

An On-Site Visit will be held on February 23, 2024 at 3:00 p.m. Local Time at Bettye Davis East Anchorage High School, 4025 E. Northern Lights Boulevard, Anchorage, Alaska 99508. Please meet at the Front Office.

A Pre-Bid Conference will be held February 27, 2024 at 11:00 a.m. Local Time at Anchorage School District, Purchasing Department, located at 4919 Van Buren Street Anchorage, Alaska 99517. Prospective Bidders who wish to participate by teleconference may participate by calling (907) 742-6750. The line will be available approximately 5 minutes prior the conference start time.

All Bidders are encouraged to attend the On-site Visit and Pre-Bid Conference. Major sub-bidders are also encouraged to attend.

The Anchorage School District is committed to providing reasonable accommodation, according to applicable state and federal laws, to all individuals with a qualifying disability. If you require a reasonable accommodation in order to participate in this or any other district process, please contact the Anchorage School District's Compliance/Equal Employment Opportunity Office at (907) 742-4132.

END OF SECTION

INSTRUCTIONS TO BIDDERS

PART 1 GENERAL INFORMATION

- 1.01 Refer to the Invitation to Bid for information relating to time, date and place for receipt of bids and other pertinent bidding information.
- 1.02 Anchorage School Board Policy 3515.5 prohibits a contractor whose employees or agents may have direct or incidental contact with Anchorage School District (the District) students from sending any employee or agent to district property who has been convicted of a sex offense under federal law or the law of any state and who is required to register as a sex offender under Alaska law or by court order, or who has been convicted of child kidnapping under federal law or the law of any state and who is required under Alaska law or court order to register on the Alaska Department of Public Safety Sex Offender/Child Kidnapper Central Registry. Board Policy 3515.5 requires contractors to certify in writing the contractor's knowledge of and compliance with Board Policy 3515.5. **Prior to executing a contract** for this project, the selected Contractor shall verify that no employee or agent who will be on district property is registered as a sex offender or child kidnapper in Alaska [Alaska Department of Public Safety "Sex Offender/Child Kidnapper Registry"] or in any other state. In addition, the contractor shall certify that, to its knowledge, no employee or agent is a convicted sex offender or child kidnapper. The required forms of certification are included in the bid documents.
- 1.03 LICENSE REQUIREMENTS
- A. The bidder shall include on the bid Form his current Business License number and expiration date from the State of Alaska authorizing him to engage in business to operate as a Business, Specialty or General Contractor, as well as his Federal Tax Identification number.
- B. The bidder shall provide a copy of his current State of Alaska Business License and Specialty or General Contractor license when requested in writing by the Purchasing Department.
- 1.04 BIDS
- A. The bidder shall review all of the proposed contract documents to ascertain all of the requirements of the work.
- 1.05 EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS AND SITE WORK
- A. The bidder shall examine carefully the site of the proposed work, the proposal, plans, specifications and contract forms before submitting a proposal. The submission of a bid shall be an admission that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirement and accuracy of the plans, specifications, special provisions and terms of the contract.
- B. All documents furnished to any person, under any condition, remain the property of the Anchorage School District and shall be returned immediately upon request.
- C. Documents may be obtained upon the conditions set forth in the Invitation to Bid.
- 1.06 METHOD FOR CLARIFICATION
- A. Any bidder in doubt as to the meaning of any part of the plans, specifications or other documents may submit a written request for an interpretation. The bidder submitting the

request will be responsible for its prompt delivery not less than seven (7) working days prior to the date set for opening of bids. Questions can be delivered as follows:

1. Fax: (907) 243-6293
2. Email: purchasing@asdk12.org
3. Mail: Purchasing Department
4919 Van Buren Street
Anchorage, Alaska 99517
4. Hours: 7:30 a.m. – 4:00 p.m.

- B. A written request for an interpretation, which in the opinion of the Purchasing Department requires a reply, will be answered by issuing an addendum to all plan holders prior to the bid opening. The Owner will not be responsible for any other explanation or interpretation of the plans, specifications or other documents made or given prior to the bid opening.

1.07 PREPARATION OF BIDS

- A. Preparation and Submission:

Bids must be submitted on the forms furnished or copies thereof, and must be manually signed. In order to secure consideration, the bid must be submitted and sealed in an envelope on which contract identification is plainly marked on the outside. The bid form is included in the bidding documents. The envelope shall be addressed as indicated in the Invitation to Bid.

- B. Form:

The bid may provide for a quotation of a price, or prices, for one or more items which may be lump sum bids, alternate prices, scheduled items resulting in a bid on a unit of construction, or a combination thereof. Where required on the bid form, bidders must quote on all items and they are warned that failure to do so shall disqualify the bid.

If erasures or other changes appear on the forms, each such erasure or change must be initialed by the person signing the bid.

- C. Alternate Bids and Qualified Bids:

Bids may be rejected if they show any omissions, alteration of the forms, additions not called for, conditional or alternate bids not called for or irregularities of any kind.

1.08 BID GUARANTEE

- A. Each bid shall be accompanied by a bid bond with good and sufficient surety or sureties acceptable to the Owner. The Anchorage School District will require five percent (5%) of the total amount of the base bid as a guarantee (**cash, personal, or business checks are not acceptable**). Bid guarantees for the three (3) low bidders will be held until the contract is executed.
- B. All other bid guarantees will be returned within seven (7) days of the bid opening. Power of Attorney for the official signing of the bond for the surety company must be submitted with the bond.

1.09 ALTERNATES

- A. The bidder shall include in the spaces provided on the "Bid Form" a bid for each alternate, if applicable.
- B. The Owner may accept alternates in any order or number and include them in the contract award price.

1.10 UNIT PRICES

- A. The bidder shall include in the spaces provided on the "Bid Form" a bid for each unit price, if applicable.
- B. The Owner may accept any or all of these unit prices and include them in the contract award price.
- C. In the case of discrepancy in the extended price calculation(s), the unit price(s) will prevail.

1.11 BIDDER QUALIFICATIONS (TO BE INCLUDED IF THERE IS NO 2-STEP QUALIFICATION PROCESS)

- A. Before the bid is considered for award, the Owner reserves the right to request the bidder to complete within seventy-two (72) hours a bidder qualification form and/or a current financial statement prepared by a Certified Public Accountant. Bidder qualifications to be listed upon the qualification form will include, as a minimum, a listing of bidder's previous contracts of a nature similar to that being bid upon; a listing of bidder's staff, to include managerial, technical and laboring positions; summary of bidder's plan and equipment available for use in the execution of the contract; and a listing of the projects to which the bidder is obligated in the near future. The Owner reserves the right to reject the bid of any bidder who fails to furnish promptly and properly all the information required in this paragraph.
- B. A bidder will be deemed to be unqualified to perform the contract if, after review and verification of the representations included on the qualification form submitted by the bidder, the following conditions appear:
 - 1. Bidder does not have sufficient prior experience (or an acceptable substitute thereof, as described below) with projects of a similar nature in technical, managerial and financial requirements to that in the present contract being bid.
 - a. Experience does not necessarily mean that the bidder is an established Contractor in the exact technical area for which the bid is submitted. In addition to such established contractors, newly established contractors will be considered qualified if they have shown on the bid qualification sheet form that they are staffed with sufficient technical, managerial and financial personnel with prior experience in the nature of construction for which the bids are invited, that bidder may adequately foresee and appreciate problems of such construction.
 - 2. Bidder does not have sufficient capability to undertake the obligations of the contract. A determination in this respect will be made when the Owner, upon review of the probable cash flow needs of the Contractor for this particular contract (to include payroll, cost of material and supplies, equipment rental costs and any other direct or incidental costs of the contract), determines that the Contractor does not have sufficient financial resources to enable him to satisfy his financial

obligations under the contract. The Owner will consider all other pertinent financial data required by this clause and submitted by the Contractor. A determination that the bidder is unqualified will not be made under this paragraph unless the Owner has determined that the bidder cannot meet his financial obligations under the contract after having considered all sources of income available to the bidder.

3. The bidder does not have sufficient staff, equipment or plant available to perform the contract. The Owner's determination in this matter will be based upon that represented by the bidder in his completion of the Bidder Qualification documents discussed above.
4. The bidder has a consistent history of unsatisfactory performance of contracts of this or similar nature, regardless of whether such contracts existed between the Owner and the Contractor, or other parties and the Contractor.
 - a. A determination of this nature will not be made unless the Owner, after review and verification of the contractor's previous work experience, determines that the contractor's consistent, unsatisfactory performance has resulted from the contractor's failure rather than a failure to perform by the other party. The Owner will give the Contractor an opportunity to explain such nonperformance(s) before any final determination is reached. Contract disputes which are pending resolution before any duly authorized judicial or administrative body will not be considered in reaching this determination.
 - b. A determination of a "consistent failure to perform" will not be made unless the Owner is satisfied after review of the bidder's prior experience that the Contractor has repeatedly failed to satisfy his obligations under past contracts. For purposes of this clause, "consistent" will not be construed to mean in every contract, nor will it be construed to include "isolated instances" of failure to perform.
 - c. In reaching any determination of this nature, the Owner may consider statements of other parties to the prior unperformed contracts, as well as the representations of the Contractor on his "Bidder Qualification" form. However, in each instance, the Owner will advise the Contractor of such other statements considered before a determination that the bidder is not qualified, as made by the Owner.
- C. The bidder's representations concerning his qualifications will be construed as a covenant under the contract. Should it appear that the bidder has made a material misrepresentation on his "Bidder Qualification" form, the Owner shall have the right to terminate the contract for the Contractor's breach, and the Owner may then pursue such remedies as exist elsewhere under this contract, or as otherwise are provided at law or equity.
- D. A determination that a bidder is unqualified will be made by the Owner. Such determination will be made in writing and include a thorough discussion of why the bidder is deemed unqualified. A letter will be sent to the bidder deemed unqualified, stating the reasons for such determination, and the bidder's right to request a review of this determination by appeal to the Anchorage School District Board.
- E. Any bidder who is deemed to be unqualified may, as provided under existing Anchorage School District policy, appeal such determination to the Anchorage School District Board prior to contract award to another bidder.

1.12 RECEIPT AND OPENING OF BIDS**A. Time of Opening:**

Bids shall be submitted prior to the time specified in the Invitation to Bid, and the exact date and time of receipt of bids will be recorded. Late bids will not be considered, but will be held unopened until the time of award and then returned to the bidder, unless other disposition is requested or agreed to by the bidder. Time of bid receipt will be determined by the time stamp at the Purchasing Department, 4919 Van Buren Street, Anchorage, Alaska 99517.

B. FAX/Telegraph/Telephonic/E-Mail Bids:

FAX/telegraphic/telephonic/e-mail bids will not be considered. Modification by FAX or telegraph of bids already submitted will be considered if received prior to the time fixed in the Invitation to Bid. FAX/telegraphic modifications shall not reveal the amount of the original or revised bid.

C. Officer's Responsibility:

No responsibility will attach to any officer or agent of the Owner for the premature opening of, or the failure to open a bid not properly addressed and identified.

1.13 WITHDRAWAL OF BIDS

A. Bids may be withdrawn on written request received from the bidders prior to the time specified for opening.

B. No bid shall be withdrawn for a period of ninety (90) days subsequent to the bid opening without the written consent of the Owner.

1.14 BIDDERS INTERESTED IN MORE THAN ONE BID

A. If more than one bid is offered by any party, by or in the name of his clerk, partner, or other person, all such bids will be rejected. A party who has quoted prices to a bidder is not thereby disqualified from quoting prices to other bidders, or from submitting a bid directly for the work.

1.15 BIDDERS PRESENT

A. At the time and place specified for the opening of bids, contents of the bids will be made public for the information of bidders and other parties.

1.16 REJECTION OF BIDS

A. The Owner reserves the right to reject any or all bids, and to waive any informalities or irregularities in bidding or award of the contract.

1.17 AWARD OF CONTRACT**A. Acceptance of Bid:**

Following the opening and evaluation of bids, the Owner will determine the apparent low responsive bidder and, subject to its right under Paragraph 1.16 to reject all bids, decide whether to accept the apparent low responsive bid. The Owner's acceptance of the

apparent low responsive bid will be through a written notice from a duly authorized representative of the Owner, and no other act of the Owner or its representative will constitute an acceptance of a bid. The notice shall be titled "Notice of Intent to Award Contract," and shall set forth pre-award procedures and requirements, if any, including procedures for approval and award of contract by the School Board.

B. Basis of Award

1. It is the Owner's intention to award a contract to the lowest responsive and responsible bidder, including alternates, base bid, and quantified unit prices accepted by the Owner at the time of award, if applicable.
2. Unit prices which are not quantified will not be included in the determination of the award.
3. The Owner reserves the right to award the alternates in any combination with the base bid and include them in the total award.
4. The District reserves the right to request the lowest bidder(s) whose bids are determined to be reasonably susceptible to award to review their previous bids with consideration of any additions, clarifications or modifications, submit revised bids for Best and Final Offers (bids). If Best and Final Offers are requested, selected offerors must submit revised bids on the forms provided by the District to be considered for evaluation and award. Bidders who do not submit a Best and Final Offers (revised bids), when requested, will not be considered for evaluation and award and their bids will be rejected and considered non-responsive.
 - a. For purposes of this ITB, bids that are "reasonably susceptible to award" means the three (3) lowest responsive and responsible bidders, unless, in the sole discretion of the District's Purchasing Senior Director, one or more of the three lowest responsive and responsible bidder(s) was not within the competitive range and to remain under consideration for award when evaluated with other bids or the District received one or more additional bids that are within the competitive range of the three lowest responsive and responsible bids such that the additional bid(s) may remain under consideration when evaluated with the other bids. This is a strict mathematical evaluation and may not be challenged on that basis except in the case of obvious arithmetic errors.

C. Notification of Award to Bidders:

Following opening of bids and determination of the apparent low responsive bidder, the Administration will make public in the Purchasing Contracting Office each Notice of Intent to Award ten (10) calendar days prior to the scheduled award by the Board, except for purchases under \$100,000 which is three (3) business days. Bidders may, upon request to the Purchasing Office and/or Purchasing Contracting Office, review the bid tabulation summary prior to the scheduled Board award date.

D. Amount of Contract

The amount of the contract shall be understood to be the lump sum as given in the bid form. Where prices are given on alternative items, only the amounts of the alternates accepted by the Owner will be included in the total.

E. Execution of Contract:

By the Contractor: The bidder whose bid is accepted shall execute the contract and furnish the required bonding and insurance within five (5) days after

presentation of the contract for signature. The contract shall be deemed to be executed by the successful bidder when two (2) originals of the contract, signed by an authorized officer of the corporation or company, and with each separately signed the bonds and insurances required herein, are received by the Owner. Failure or neglect to execute the contract, within the time specified or such extended period, if any, that the Owner may, in its sole discretion, authorize, shall constitute a breach of the agreement affecting the acceptance of the bid. The damages to the Owner for such a breach shall include loss from interference with the general Capital Improvements Program of the Owner, and other items whose accurate amount would be difficult or impossible to compute.

The amount of the bid guarantee of the successful bidder who fails or neglects to execute the contract after proper notification of the acceptance of the bid shall be retained by the Owner as liquidated damages for such breach.

By the Owner: Upon receipt of the above-referenced two (2) Contracts executed by the Contractor, including all required bonds and insurance certificates, the properly authorized Owner representatives will execute the documents within ten (10) days. The contract shall be deemed to be completely executed when two (2) copies thereof, accompanied by the required bond, liability and other necessary insurance and signed by the Contractor, are executed by the Owner. All awards shall comply with the Anchorage School District Purchasing and Contracting Policy 3311. Awards of \$500,000 or more shall be presented to the School Board for their approval.

1.18 PERFORMANCE BOND AND PAYMENT BOND

- A. The successful bidder will furnish a Performance Bond and a Payment Bond in accordance with Section 00700, Paragraph 7.5.

1.19 INSURANCE

- A. The successful bidder will furnish complete Certificates of Insurance, as required by the General Conditions and Supplementary Conditions, in a form acceptable to the Owner.

1.20 NOTICE TO PROCEED

- A. The Owner will issue a Notice to Proceed with the work within ten (10) days following the Owner's execution of the contract. The date of commencement of the work shall be the date established in the Notice to Proceed. The Owner will not be responsible for any costs incurred by the Contractor prior to the Notice to Proceed.

1.21 AGGRIEVED BIDDERS

- A. Protest:
 - 1. An interested party may protest a solicitation or a proposed award of a contract.
 - a. A protest as to the specifications and/or terms and conditions of a solicitation must be received by the Purchasing Senior Director at least five (5) calendar days prior to the due date of the bid or proposal; failure to protest as provided herein constitutes a waiver of any objection to the solicitation.

- b. For construction projects and architectural/engineering design services, the protest of a proposed award of a contract must be received by the Purchasing Senior Director within ten (10) calendar days after issuance of the notice of intent to award, except that for purchases under \$100,000, the protest must be received within three (3) business days.
 - c. For goods or services, the protest of a proposed award of a contract must be received by the Purchasing Senior Director within seven (7) calendar days after issuance of the notice of intent to award, except that for purchases under \$100,000, the protest must be received within three (3) business days.
 - d. The protest must include the name of the person submitting the protest, the name of the bidder/proposer represented by that person, the specific action or bid/request for proposal contract award which is being protested, a detailed explanation of the reasons for the protest, and the relief requested.
 - e. The aggrieved person must serve all other interested parties with its protest.
2. The Purchasing Senior Director shall stay the intended award of a contract unless the Purchasing Senior Director determines the award of the contract without further delay is necessary to protect the District's best interest.
 3. The Purchasing Senior Director may, in his/her sole discretion, hold a hearing.
 4. The rights and remedies granted by this section are not available for informal small purchases with an actual or potential value of less than twenty-five thousand dollars (\$25,000).
 5. Failure to protest as provided herein constitutes a waiver of any objection to the solicitation and contract award.
- B. Appeal:
1. A decision by the Purchasing Senior Director may be appealed to the Anchorage School Board.
 2. Any appeal shall be filed with the Superintendent within five (5) days after the decision is received by the protester and must include the name of the person submitting the appeal, the name of the bidder/proposer represented by that person, and a detailed explanation of the basis for the appeal.
 3. The aggrieved bidder/proposer must serve all other interested parties with its appeal.
 4. The Superintendent may obtain an independent review of the appeal issues if the Superintendent determines such review will assist consideration of the appeal.
 5. The independent review shall be conducted by a not directly involved District employee or an experienced but disinterested third party from outside the District.
 6. Failure to appeal to the Anchorage School Board as provided herein constitutes a waiver of any objections to the solicitation and the contract award.

C. Consideration of Appeal:

1. The decision being appealed and the findings from the independent review, if any, will be reported to the Board.
2. Upon consideration of the appeal and allowing interested parties an opportunity to address the issues on appeal, the Board may:
 - a. Award the contract as recommended, if applicable, indicating its reasons for rejecting the appeal;
 - b. Grant the appeal, indicating its reasons for granting the appeal, and determine an appropriate remedy consistent with AR3311.1(c).1 of Board Policy. The Board may award the contract at that meeting to some other bidder/proposer if it finds that a delay in making the award would adversely affect the District;
 - c. Stay any award of the contract to permit further consideration of the appeal, with action to be scheduled as soon as practicable, but in no event more than twenty (20) days after the stay as initiated;
 - d. Reject all bids/proposals.
 - e. Take such other action as appears appropriate and in the best interest of the District under the circumstances.

D. Frivolous Protests:

1. Signature on Protest Constitutes Certificate
The signature of an attorney or party on a request for review, protest, motion, or other document constitutes a certificate by the signer that the signer has read the document, to the best of his/her knowledge, information, and belief formed after reasonable inquiry it is well grounded in fact and is warranted by existing law or a good faith argument for the extension, modification, or reversal of existing law, and that it is not interposed for an improper purpose, such as to harass, limit competition, or to cause unnecessary delay or needless increase in the cost of the procurement or of the litigation.
2. Sanctions for Violation
If a request for review, protest, pleading, motion, or other document is filed with the Purchasing Senior Director is signed in violation of Board Policy AR3311.1(c).1, the Board, may impose upon the person who signed it, a represented party, or both, an appropriate sanction, that may include an order to pay to the other party or parties the amount of the reasonable expenses incurred because of the filing of the protest, pleading, motion, or other paper, including a reasonable attorney's fee.

1.22 GUARANTEE SECTION

- A. Whether or not there appears here or elsewhere herein specific reference to guarantees of all items of material, equipment or workmanship, they nevertheless shall be so guaranteed against defects for which the Contractor is responsible that may develop or

become evident within a period of one (1) year from and after final acceptance of the work by the Owner. This guarantee shall be understood to imply prompt attention to any remedy of such defects as those mentioned above if and as they occur after the Contractor shall have written notice of their existence. If the defect, in the opinion of the Owner, is of such nature as to demand immediate repair, the Owner shall have the right to make them and the cost thereof shall be borne by the Contractor.

1.23 SUBCONTRACTORS

- A. All subcontractors proposed for the work must be acceptable to the Owner.
- B. The Owner reserves the right to request the proposed subcontractors to complete qualification forms and/or current financial statements prepared by a Certified Public Accountant.

1.24 MINIMUM WAGE RATES

- A. Labor required for the construction of this project is subject to the minimum wage rates as provided in the General Requirements.

1.25 NON DISCRIMINATION

- A. No bidder/offeror on any District contract may illegally discriminate on the basis of sex, race, color, religion, gender identity, sexual orientation, national origin, ancestry, age, marital status, changes in marital status, pregnancy, parenthood, physical or mental disability, Vietnam era veteran status, genetic information, or good faith reporting to the board on a matter of public concern in employment, provision of services, or otherwise.
- B. Any bidder/offeror submitting a bid or proposal of one hundred thousand (\$100,000) or more must certify that if awarded a contract on the basis of that bid or proposal, he/she as the contractor will not illegally discriminate against any member or applicant for employment because of sex, race, color, religion, gender identity, sexual orientation, national origin, ancestry, age, marital status, changes in marital status, pregnancy, parenthood, physical or mental disability, Vietnam era veteran status, genetic information, or good faith reporting to the board on a matter of public concern in employment, provision of services, or otherwise.
 - 1. Notice of Compliance
 - a. All successful bidders/offerors shall insure such non-discrimination.
 - b. All successful bidders/offerors must agree to post in conspicuous places, available to employees and applicants for employment, notice setting forth the provisions of this non-discrimination section and this section shall be deemed to be a part of every contract entered into by the District under these policies.
 - 2. Minority Business Enterprises
 - a. The District requires adherence to the Anchorage Municipal Code, relating to Minority Business Enterprises and will monitor and implement these policies through the District's Equal Employment Opportunity Director (EEO).

- b. It is the policy of the District that socially and economically disadvantaged minority businesses located within the Municipality of Anchorage be afforded an equitable opportunity to participate in District contracts.
- c. Any appeal from a decision of the Equal Employment Opportunity Director shall be to the Superintendent and, if not satisfied, to the Board.

1.26 ASBESTOS FREE MATERIALS

- A. The bidder, by submitting a bid on this project, thereby certifies and guarantees to the Anchorage School District that any products or materials sold, used or installed under the terms of this contract will not contain any asbestos. In the event the product sold does not conform to the above standards, the buyer may return the product for correction or replacement at the seller's option and at the seller's expense. Services performed by the seller which do not conform to the above standards must be corrected by the seller at the seller's expense or make the appropriate correction within a reasonable time.

1.27 CONFLICT OF INTEREST

- A. The Contractor agrees to certify that Anchorage School District employees, School Board members, or a member of their household are not in conflict of interest with the contract and Board Policy as follows (AR3311.1(e).1 Disclosure and Waiver of Conflict of Interest):
 - 1. No Board member, employee, or a member of their household, shall acquire, directly or indirectly, an economic interest in a District or Municipal contract, or engage in business with the District or the municipality, unless the contract is competitively solicited and other requirements of Section 3311 of Board Policy and section 1.15 of the Anchorage Municipal Code are met.
 - 2. The following acts and circumstances shall not be deemed to be in conflict with the performance of official duties if, at the earliest opportunity after having acquired such knowledge, the Board member or employee files a disclosure pursuant to AR3311.1(e).1 or requests and obtains a waiver pursuant to Board Policy AR3311.1(e).2:
 - a. Such person owns a sole proprietorship, or is a partner in a partnership, or is an officer, director, major shareholder (five percent (5%) or more of the outstanding shares) or has management control in a corporation that submits a bid, proposal or quotation to the District or attempts to enter or enters into a contract with the District;
 - b. Such person has any significant (five percent (5%) or more) financial interest in any sale, lease or rental to the District of any service or property and such person has knowledge that the District intends to purchase, lease or rent the property or service;
 - c. Such person wishes to sell or receive royalties on books or materials sold to the District for use in the school system for which the employee is the author;
 - d. Such person is an employee who has been providing private services to a child who transfers to a new school or class or advances to a higher grade and the child becomes a student in the class being taught/aided by his/her provider.

- B. Board Members, District employees, and their household and/or immediate family members are required to comply with Board Policies and the Municipal Ethics Code by disclosing conflicts of interest.
1. When a board member, employee, or their household and/or immediate family member intends to do business with the District, the appropriate District and Municipal forms must be filed by the Board Member or District employee with the Municipal Clerk's Office and the Purchasing Department.

Note: *Notice of Intent To Respond To Public Solicitation* shall be filed with the Municipal Clerk's office in advance to allow a minimum of **7 calendar days to elapse between electronic publication by the clerk and the final date** for submitting a response to the solicitation. The form may be obtained from the Municipality of Anchorage website, www.muni.org.

District *Disclosure* and *Request for Waiver* forms and instructions may be obtained from the Purchasing Bid Information link under Quick Links on the ASD website, www.asdk12.org.

2. The responsibility for complete and timely filing rests solely with the Board Member or District employee.

- C. Copies of all conflict of interest and ethics code documents should be submitted with your quote.

1.28 CONTRACT INDUCEMENTS

- A. No payment, gratuity or offer of employment shall be made in connection with any contract, by or on behalf of the subcontractor to the prime contractor or higher tier subcontractor or any person associated therewith, as an inducement for the award of a subcontract or order.

1.29 GOVERNANCE

- A. This solicitation is an Invitation to Bid ("ITB") governed by applicable Anchorage School Board Policies, including Section 3311 of such Policies. Anchorage School Board Policies are available at <https://www.boardpolicyonline.com/?b=anchorage>

Offerors should read this ITB carefully and review all instructions contained herein. Incomplete or incorrect bids may be rejected as not conforming to the essential requirements of the ITB. Bids submitted on other than the prescribed forms contained in this ITB will be rejected. Bidders may copy the forms contained in the ITB for use in their bids, but substitute forms or formats are unacceptable. Electronic copies of the forms which bidders must submit as part of any bid, if any—if not provided with this ITB—may be obtained by contacting the Anchorage School District Purchasing Department. Forms shall not be altered except to supply requested bidder information.

1.30 APPRENTICESHIP UTILIZATION COMPLIANCE

- A. In order to be deemed a responsive bid/offer, bidders/offerors shall provide a signed notarized Apprenticeship Utilization Affidavit ("AUA") with their bid. ASD reserves the right to request the signed notarized AUA to be submitted within three (3) working days after bid submission. By doing this, bidders/offerors are confirming that they understand and agree

that in all trades/crafts categories in which there is an Alaskan Federally Registered Apprenticeship Program, they will ensure that 15% of the aggregate hours in those trades' categories will be worked by apprentices, as mandated by Anchorage School Board Policy 3311.1.2. This applies to both prime contractor labor hours and subcontractor labor hours. By signing the AUA, bidders/offerors are confirming their understanding and agreement that ASD will request documentation to factually demonstrate compliance with the 15% Apprenticeship Utilization Policy ("AUP"), and conduct audits. Audits for smaller projects will be conducted every 30 days, larger projects will be audited every 90 days. In addition to providing documentation to ASD to confirm that 15% of the labor hours worked in trades/crafts categories that have Alaskan Federally Registered Apprenticeship Program has been done by certified apprentices enrolled in such programs, the prime contractor will provide documentation to confirm that the apprentices listed on the documentation submitted are currently in good standing in their Alaskan Federally Registered Apprenticeship Program. Attached to the solicitation will be the current version of the Federally Registered Alaskan Apprenticeship Programs, which was provided to ASD by the Federal Department of Labor.

- B. Forms used to demonstrate compliance during the contract administration period are found in Section 00630 Construction Forms.
1. List of Federally Registered Alaskan Apprenticeship Programs
 - a. This list from the Federal Department of Labor will provide contractors with a list of Alaskan apprenticeship programs and crafts/trades categories that are subject to ASD's AUP.
 2. Apprenticeship Utilization Form
 - a. The Prime Contractor will list the crafts/trades categories required to complete the project that have Alaskan Federally Registered Apprenticeship Programs. This list will include all crafts/trades categories for both the prime and subcontractors.
 3. Apprenticeship Utilization Program Calculation Form
 - a. This form will be submitted by the prime contractors to demonstrate compliance with the apprenticeship utilization percentage for both prime and subcontractors on the project.
 - b. Audits will be performed when the hours submitted by the prime's and/or subcontractor's certified payroll exceed 500 hours. Audits will continue as per the schedule unless the prime's and the subcontractor's certified payroll does not meet the minimum threshold of 500 hours. Prime and Subcontractors will be required to submit certified payrolls during periods where very little work is being performed. This will continue until the minimum threshold of 500 hours is met and warrants an audit. Audits will be conducted from Site Available to Contractors through Final Completion on all projects awarded by the District in excess of \$100,000 at the time of bid.
 4. Penalty Table

- a. This table lists the penalties for non-compliance with the AUP.
- C. Prime Contractors are required to meet with Purchasing to discuss forms and processes of Apprentice Utilization Program prior to start of work.

END OF SECTION

PROJECT SCHEDULE MILESTONE DATES

Division 0
Section 00200

PROJECT SCHEDULE MILESTONE DATES

On-Site Visit	February 23, 2024
Pre-bid Conference	February 27, 2024
Bid Opening	March 19, 2024
Board Meeting (anticipated).....	April 9, 2024, Non-Action, April 23, 2024, Action
Notice to Proceed (anticipated).....	May 15, 2024
Site Available to Contractor.....	May 28, 2024
Substantial Completion – Area F Base Bid	August 9, 2024
Substantial Completion – Area F Add Alternate No. 2 Toilets if Awarded	August 9, 2024
Substantial Completion – Add Alternate No. 1 Plaza Deck if Awarded	September 3, 2024
Substantial Completion – Area E Base Bid.....	August 8, 2025
Substantial Completion – Area E Add Alternate No. 2 Toilets if Awarded.....	August 8, 2025
Substantial Completion – Add Alternate No. 3 Fire Alarm if Awarded.....	August 8, 2025
Substantial Completion – Add Alternate No. 4 Store Front if Awarded	August 8, 2025
Substantial Completion - Site.....	August 29, 2025
Final Completion	September 5, 2025

Dates of Interest:

Presidents Day Holiday.....	February 19, 2024
Parent Teacher Conferences	February 21 – 22, 2024
Spring Break Week	March 11 – 15, 2024
School Ends for Students.....	May 22, 2024
Teachers Last Day	May 23, 2024
Memorial Day	May 27, 2024
Juneteenth Holiday	June 19, 2024
Independence Day Holiday	July 4, 2024
Teachers First Day.....	August 12, 2024
Students First Day.....	August 15, 2024
Labor Day	September 2, 2024
Indigenous Peoples Day	October 14, 2024
Parent Teacher Conferences	October 23 – 24, 2024
Thanksgiving Holiday	November 28 – 29, 2024
Winter Vacation.....	December 23, 2024 – January 3, 2025
Martin Luther King Holiday.....	January 20, 2025
Presidents Day Holiday.....	February 17, 2025
Parent Teacher Conferences	February 26- 27, 2025
Spring Break Week	March 10 – 14, 2025
School Ends for Students.....	May 21, 2025
Teachers Last Day	May 22, 2025
Memorial Day Holiday	May 26, 2025
Juneteenth Holiday	June 19, 2025
Independence Day Holiday	July 4, 2025
Teachers First Day.....	August 11, 2025
Students First Day.....	August 14, 2025
Labor Day	September 1, 2025

PROJECT SCHEDULE MILESTONE DATES

Division 0
Section 00200

The Contractor shall be required to plan, schedule, execute and complete all work under the contract in accordance with the Project Schedule Milestone Dates set forth under this Section 00200. The above listed Project Schedule Milestone Dates for Substantial Completion and Final Completion may not be altered by the Contractor, either to schedule or to achieve early completion of the project, without the express written consent of the Owner.

The bidder's attention is drawn to the requirements of Division 1, Section 01311 of the General Requirements entitled Project Schedule and to the Phasing Drawings for associated phasing information.

END OF SECTION

Project Title: Bettye Davis East Anchorage HS
Safety Upgrades Academic Area

Invitation to Bid Number: 2024 – 811

TO: Anchorage School District
4919 Van Buren Street
Anchorage, Alaska 99517

FROM: _____ BIDDER
_____ ADDRESS
_____ CITY/STATE
_____ PHONE/FAX
_____ EMAIL

Operating as (strike out conditions that do not apply) an individual, a company, a corporation, organized and existing under the laws of the State of _____, or a proprietorship, a partnership, or joint venture consisting of _____.

1. BASE BID:

Having become completely familiar with the local conditions affecting the cost of the work at the place where work is to be executed, and having carefully examined the site and building conditions as they currently exist, and having carefully examined the proposed contract documents, together with any addenda to such contract documents as listed hereinafter, the undersigned hereby proposes and agrees to provide all labor, materials, equipment, transportation, supervision and other facilities as necessary and/or required to execute all of the work described by the aforesaid contract documents for the lump sum consideration of:

\$ _____ (In Numbers)

Said amount being hereinafter referred to as the base bid, base bid proposed, or lump sum.

2. ALTERNATES:

The undersigned proposes to perform alternates for the stated resulting additions or deductions from the base bid. Additions and deductions shall include any modifications of work or additional work that the undersigned may deem to be required to perform by reason of the acceptance or rejection of any alternate, including allowances for overhead and profit, and in accordance with the Project Schedule Milestone Dates set forth under Section 00200 hereof. The Owner reserves the right to award the alternates in any order or number and include them in the contract award price.

A. Alternate Number One: Repair Exterior Plaza Deck at Area B South of Gym

Adjust Base Bid by ADDING: \$ _____ (In Numbers)

- B. Alternate Number Two: At Areas E and F renovate existing toilet rooms including replacement of all plumbing fixtures, toilet partitions, floor and wall finishes and toilet room accessories, demolish heating convectors and replace with new mechanical. Toilet renovations shall be ADA compliant.

Adjust Base Bid by ADDING: \$ _____ (In Numbers)

- C. Alternate Number Three: Throughout the School Building repair/replace existing fire alarm systems.

Adjust Base Bid by ADDING: \$ _____ (In Numbers)

- D. Alternate Number Four: At Area E replace existing storefront system and associated fin tube at one location.

Adjust Base Bid by ADDING: \$ _____ (In Numbers)

3. UNIT PRICES:

The following unit prices will be used at the discretion of the Owner for the addition or deletion of work not reasonably implied or not included in the Contract Documents. Unit prices must include all labor, material, overhead, and profit for each unit of work. All unit price work will be processed by Request for Proposal followed by a Change Order to the Contract when quantities are verified and agreed upon.

- A. None

4. ALLOWANCES / ASSIGNMENTS:

- A. Siemens Building Technologies \$TBD Pending (In Numbers)

5. ADDENDA ACKNOWLEDGMENT:

The undersigned acknowledges receipt of the following addenda: (List by number and date appearing on addenda.)

6. TIME OF COMPLETION:

The undersigned agrees to complete all work under this contract in accordance with the Project Schedule Milestone Dates set forth under Section 00200 hereof.

7. BID SECURITY:

A bid bond in the amount of five percent (5%) of the total amount of the base bid is attached in the sum of:

\$ _____ (In Numbers)

which is to become the property of the Owner in the event the Performance Bond and Payment, Bond are not executed within the time set forth in paragraph 9 of this section, as liquidated damages for the delay and additional work caused the Owner.

8. The undersigned agrees that upon receipt of the notice of acceptance of his bid, he will execute the formal contract, and will deliver all proper bonds and proof of insurance coverage as may be required by the contract documents.
9. The undersigned agrees to accept the Assignment of the Bid Allowance as set forth in Section 01031, Bid Allowances.
10. The undersigned further agrees to execute the formal contract within ten (10) days from the date of the notice of acceptance of this bid, and in case the undersigned fails or neglects to appear within the specified time to execute the contract, the undersigned will be considered as having abandoned the contract, and the bid bond accompanying this bid will be forfeited to the Owner by reason of such failure on the part of the undersigned.
11. The undersigned further agrees to commence with the work under the contract in accordance with the date of commencement of the Work established in the Notice to Proceed.
12. The undersigned further agrees that the bid security may be retained by the Owner and that said bid guarantee shall remain with the Owner until the contract has been executed by the Owner.
13. The undersigned has checked all of the above figures, and understands that the Owner will not be responsible for any errors or omissions on the part of the undersigned in preparing this bid.
14. In submitting this bid, it is understood that the right is reserved by the Owner to reject any or all bids and waive any informalities and irregularities in connection therewith. It is agreed that this bid may not be withdrawn for a period of forty-five (45) days from the date and time of opening.
15. The undersigned declares that the person or persons signing this Bid Form is/are fully authorized to sign on behalf of the firm listed and to fully bind the firm listed to all the conditions and provisions thereof.
16. It is agreed that no person or persons or company other than the firm listed below or as otherwise indicated has any interest whatsoever in this bid or the contract that may be entered into as a result of the bid and that in all respects the proposal is legal and firm, submitted in good faith without collusion for fraud.
17. It is agreed that the undersigned has complied or will comply with all requirements of local, state and national laws, and that no legal requirement has been or will be violated in making or accepting this bid in awarding the contract to him and/or in the prosecution of the work required.

18. CONFLICT OF INTEREST:

I certify no member of the School Board or District employee, or spouse or other member of his/her household shall have any undisclosed interest as noted in paragraph entitled Conflict Of Interest (Section 00100). By and for the bidder:

Signature: _____

19. APPRENTICESHIP UTILIZATION AFFIDAVIT (FOR BIDS OVER \$100,000)

Pursuant to School Board Policy 3311.1.2, Use of Apprentices, I _____

the undersigned Principal for _____

on Solicitation _____ certify:

- A. I understand that Anchorage School District (“ASD”) School Board Policy 3311.1.2 states, “For capital maintenance and construction projects with an estimated total cost of more than \$100,000, the Anchorage School District shall require that no less than fifteen percent (15%) of the total hours worked on the project shall be performed by apprentices enrolled in a federally registered or State of Alaska-approved apprenticeship program. This requirement shall only apply to crafts for which an Alaskan federally registered apprenticeship program exists.”
- B. I will ensure that apprentices employed by the prime and sub-contractors, in the eligible trades categories, will provide no less than fifteen percent (15%) of the aggregate labor hours of those eligible trades categories.
- C. I understand that if awarded a contract, ASD will audit the prime contractor at 30-day intervals for contracts from \$100,001 to \$5,000,000 and 90-day intervals for contracts exceeding \$5,000,000 and ASD reserves the right to audit at random intervals as needed.
- D. I understand ASD will conduct random site inspections to determine that employed apprentices are working at the project site.
- E. I understand that if I am awarded a contract ASD will require the following specific reporting requirements during the contract performance period to ensure that the 15% apprenticeship utilization requirement is met:
 - a. List of the apprentices the prime contractor intends to use to meet the utilization goal, and the Alaskan federally registered apprenticeship programs to which they belong (Apprenticeship Utilization Form);
 - b. List of the subcontractors that the prime contractor will use on this project;
 - c. List of the apprentices the subcontractor intends to use to meet the utilization goal required by the prime contractor, and the apprenticeship programs they belong to (Apprenticeship Utilization Form);
 - d. Submission of Apprenticeship Utilization Program Calculations Form, to be submitted by the prime contractor, at 30-day intervals for contracts from \$100,001 to \$5,000,000 and 90-day intervals for contracts exceeding \$5,000,000, consisting of a compliance spreadsheet, with supporting documents demonstrating compliance by both the prime contractor and all subcontractors, identifying the trades categories that are subject to the utilization requirement, apprentice employees used to meet the goals, and apprentice hours calculation showing compliance with the required 15% utilization when compared to total hours worked in the eligible trades categories.

- F. I understand a non-compliance penalty for projects from \$100,001 to \$5,000,000 will be assessed at each 30-day audit per the Penalty Table, if I am found to be non-compliant during the contract period.
- Failure to comply at 1st 30-day audit will result in a penalty per the Penalty Table, which will be deducted from the prime contractor's invoice.
 - Failure to comply in a consecutive 2nd 30-day audit will result in a penalty per the Penalty Table, which will be deducted from the prime contractor's invoice.
 - Failure to comply in a consecutive 3rd 30-day audit will result in a penalty per the Penalty Table, which will be deducted from the prime contractor's invoice.
 - Failure to comply in a consecutive 4th 30-day audit will result in a penalty per the Penalty Table, which will be deducted from the prime contractor's invoice, and may result in a finding of non-responsibility on future bidding. (This penalty will repeat for any future non-compliance.)
- G. I understand a penalty for projects exceeding \$5,000,000 will be assessed at each 90-day audit, if I am found to be non-compliant during the contract period.
- Failure to comply at 1st 90-day audit will result in a penalty per the Penalty Table, which will be deducted from the prime contractor's invoice.
 - Failure to comply in a consecutive 2nd 90-day audit will result in a penalty per the Penalty Table, which will be deducted from the prime contractor's invoice.
 - Failure to comply in a consecutive 3rd 90-day audit will result in a penalty per the Penalty Table, which will be deducted from the prime contractor's invoice.
 - Failure to comply in a consecutive 4th 90-day audit will result in a penalty per the Penalty Table, which will be deducted from the prime contractor's invoice, and may result in a finding of non-responsibility on future bidding. (This penalty will repeat for any future non-compliance.)
- H. Application of the Penalty Table:
- Advancement of penalties in the Penalty Table will only be assessed for consecutive non-compliance. If the contractor gets back into compliance, any future non-compliance will be assessed at the beginning step of the Penalty Table, per the applicable contract threshold category.
- I. Lack of Apprentice(s) availability:
- If a contractor is awarded a contract but cannot meet the apprenticeship utilization requirement, and fail an audit, the contractor will have the opportunity to request a waiver from the apprenticeship utilization requirement. A waiver will only be granted if the contractor can factually demonstrate that the cause was from a lack of available apprentices in eligible trades categories.
- J. ASD will provide the List of Alaskan Federal Registered Apprenticeship Programs, which contains the crafts/trades categories within those federally registered programs. Once per year, ASD will receive the updated List of Alaskan Federal Registered Apprenticeship Programs from the Federal Department of Labor to capture any new Alaskan Federally Registered Apprenticeship Programs that have been added, or to capture any that have been dissolved or discontinued. The List of Alaskan Federal Registered Apprenticeship Programs provided to ASD by the Federal Department of Labor will be posted on ASD's website, as contained in the solicitation, so contractors have access to it.
- K. Definitions:
- Alaskan Federally Registered Apprenticeship Programs** are programs approved by the Federal Department of Labor, US DOL Office of Apprenticeship.
 - Eligible Trades Categories** are the crafts/trades categories that fall under an Alaskan Federally Registered Apprenticeship Program. Eligible Trades Categories will be the

- categories measured for aggregate project hours and apprentice hours to establish the apprenticeship utilization percentage.
- c. **The List of Alaskan Federal Registered Apprenticeship Programs** is a current list provided by ASD to contractors that shows the Alaskan Federally Registered Apprenticeship Programs and the eligible trades categories under those programs. That current list will be the list in effect and in force during the issuance of the solicitation. Any changes to the list will affect future solicitations and will not be retroactive to prior solicitations.
 - d. **Random Site Inspections** are defined as non-scheduled site inspections, in which ASD's representative will visit the project site to establish if apprentices are physically on-site. ASD will provide a minimum of 24 hours' notice to contractors prior to the site inspections.
 - e. **Consecutive Non-Compliance** is when a contractor consecutively fails to meet the required apprenticeship utilization percentage. If a contractor fails an audit, but then passes the next audit, any future non-compliance will be addressed at the first step of the Penalty Table per the contract values in the table.
 - f. **The Measurement of Aggregate Apprenticeship Utilization Hours** is defined by the following. Compliance will be audited at 30-day intervals for projects from \$100, 001 to \$5,000,000, and 90-day intervals for projects over \$5, 000,000. Each 30 or 90 day audit period will be measured independently for aggregate apprenticeship utilization hours. If a contractor does not meet the 15% apprenticeship utilization requirement in an audit period, a penalty will be assessed, per the penalty table. However, the deficiency in percentage of apprenticeship utilization hours, will not be carried forward from one audit period to the next. Contractors will only be required to meet the 15% apprenticeship utilization requirement in each audit period, which will be measured independently. In addition, if the aggregate hours for all audit periods for the entire project are 15% or greater, any previously assessed penalties for non-compliance in an audit period will be rescinded.
 - g. **Finding of non-responsibility:** If ASD determines a contractor to be non-responsible, they will not be permitted to bid on ASD projects.

IN WITNESS WHEREOF, the signature of the undersigned Contractor has been hereunto set this

_____ day of _____, 20____, at _____, Alaska.

Signature: _____

Printed Name: _____

I, _____, being first duly sworn, say that I am the agent for and executed the foregoing under authority of said company to do so; that I have read the same, know the contents thereof, and the matter set forth therein are as I truly believe.

Signature: _____

Subscribed and sworn to before me this _____ day of _____, 20____, at _____, Alaska.

Notary Public in and for: _____

My Commission Expires: _____.

20. LICENSE NUMBER(S):

Alaska Business License Number: _____

Alaska General or Specialty Contracting License Number: _____

Respectfully Submitted, this _____ day of _____, 20__.

Firm Name: _____

Federal Tax ID: _____

Address: _____

Signature: _____

Name (Typed): _____

Title: _____

CORPORATE SEAL

ENCLOSURES:

1. Bid Guarantee (in the form and amount specified or required, include Power of Attorney For Surety)

END OF SECTION

ASBESTOS ABATEMENT SUBCONTRACTOR'S CERTIFICATE OF INSURANCE

Division 0
Section 00420

ASBESTOS ABATEMENT SUBCONTRACTOR'S CERTIFICATE OF INSURANCE

PART 1. GENERAL

1.01 REFERENCE:

- A. As part of the Owner-Contractor Agreement (Document 00500), the Contractor shall cause its asbestos abatement subcontractor to submit a Certificate of Insurance on an Anchorage School District Form on which the Subcontractor's insurer certifies that the Subcontractor has insurance coverage to the same extent, with the same endorsements, and with the same limits and under the same conditions as those required of the Contractor pursuant to General Conditions of the Owner-Contractor Agreement, Article 11, with the exception of builder's risk insurance and umbrella liability insurance. The Contractor shall submit to the Owner the Subcontractor's completed Certificate of Insurance within five (5) days after the Owner's approval of the proposed Asbestos Abatement Subcontractor.

PART 2. (NOT USED)

PART 3. (NOT USED)

END OF SECTION

OWNER – CONTRACTOR AGREEMENT FORM

REFERENCE:

1. The form of agreement between the Owner and the Contractor shall be the form bound herein.
2. The Agreement shall be executed in duplicate.

CONTRACT NO. XXCXXXX
SCHOOL PROJECT TITLE
ITB 202X-8XX
ASD PROJECT NO. XXXXXX

Board Memo No.: N/A or NumberDate of Contract: Date of Contract

Company
 Address
 City, State, Zip

Sole Proprietorship
 Partnership
 Incorporated in the
 State of Alaska

OWNER: ANCHORAGE SCHOOL DISTRICT, ANCHORAGE ALASKA

CONTRACT FOR: ITB SCHOOL PROJECT TITLEAmount of Contract: Amount of Contract in words Dollars and No Cents

Base Bid:	<u>\$xxx,xxx.xx</u>
Additive Alternate 1:	<u>\$xxx,xxx.xx</u>
Siemens Allowance:	<u>\$xxx,xxx.xx</u>
Total:	<u>\$xxx,xxx.xx</u>

Statement of Work: The Contractor shall furnish all labor, equipment and materials and perform the work above described for the amount stated in strict accordance with Contract Documents, all of which are made a part of this Contract and designated as follows:

CONTRACT DOCUMENTS

- I. This Contract, consisting of **two (2) pages**.
- II. Section 00620 Performance Bond and Payment Bond, consisting of **nine (9) pages**, dated **(date of contract)** and attached Power of Attorney for Surety.
- III. Contractor signed Bid Form, Section 00300 and signed Addendum/a consisting of **four (4) or five (5) pages**.
- IV. Alaska Sex Offender/Child Kidnapper Registry Contractor Certification consisting of **one (1) page**.
- V. Certificates of Insurance.
- VI. Invitation to Bid **(number)** Project Manual dated **(date)** and all Drawings are hereby incorporated by reference as if in full text.

In the event of a conflict between any of the Contract Documents and the provisions of any purchase order of materials or service request issued in connection with this Contract, the provisions of the Contract Documents shall prevail.

Work shall be started in accordance with the Notice to Proceed. Time being of the essence, work shall be completed in accordance with the Project Schedule Milestone Dates set forth under Section 00200 thereof.

The ASD Project Manager for this Contract is: **Insert Name of Project Manager Cell (907) XXX-XXXX, Office (907) XXX-XXXX and insert email address.**

The attached performance and payment bond is in due form according to law, and is hereby approved.

Anchorage School District Attorney

Date: _____

IN WITNESS WHEREOF, the parties hereto have executed this Contract as of this date entered on the first page hereof.

ANCHORAGE SCHOOL DISTRICT

CONTRACTOR BUSINESS NAME

David Whiting, Date
Senior Director of Purchasing/Warehouse

Contractor Signature Date

Contractor Print Name and Title

Corporate Seal

Account Code(s):

END OF CONTRACT

END OF SECTION

BID BOND FORM

REFERENCE:

1. If the Bid Guarantee is submitted on Bond Form, the Bid Bond shall be the form as bound herein.

BID BOND

KNOW ALL MEN BY THESE PRESENT that we, _____ as
Contractor

PRINCIPAL, and _____, a corporation duly organized under the laws
Surety

of the State of _____, as SURETY/OBLIGOR authorized to transact surety business in the
state of Alaska, are held and firmly bound unto the ANCHORAGE SCHOOL DISTRICT, as OBLIGEE, in
the amount of 5% of the Base Bid Amount for payment whereof PRINCIPAL and SURETY bind ourselves,
our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these present.

WHEREAS, the PRINCIPAL is herewith submitting its proposal for _____

The condition of this obligation is such that if the PRINCIPAL will, within the time required, enter into a
formal contract, and give a good and sufficient bond to secure the performance of the terms and conditions
of the contract, then this Obligation to be void; otherwise, the PRINCIPAL and SURETY will pay unto the
OBLIGEE the amount stated above.

OWNER

Anchorage School District
4919 Van Buren Street
Anchorage, Alaska 99517

CONSTRUCTION PROJECT

Solicitation No.: _____

Location: _____

CONTRACTOR

Name: _____

Address: _____

City/State: _____

SURETY

Name: _____

Address: _____

City/State: _____

IN TESTIMONY WHEREOF, the parties hereunto have caused the execution of this bond on the _____
day of _____, 20____.

PRINCIPAL

SURETY

Contractor Name

Corporate Surety Name (Seal)

By: _____
Signature

By: _____
Signature

Typed Name and Title

Typed Name, Attorney-in-fact

WITNESS AS TO PRINCIPAL

Note: Attach Power of Attorney for Surety Signator.

END OF SECTION

PERFORMANCE BOND AND PAYMENT BOND

REFERENCE:

1. The Performance Bond and Payment Bond shall be the forms as bound herein.

CONSTRUCTION PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENT that we, _____ as
Contractor

PRINCIPAL, and _____, a corporation duly organized under the laws
Surety

of the State of _____, as SURETY/OBLIGOR authorized to transact surety business in the
state of Alaska, are held and firmly bound unto the ANCHORAGE SCHOOL DISTRICT, as OBLIGEE, in
the amount

of _____
_____ Dollars

(\$ _____), for payment whereof PRINCIPAL and SURETY bind ourselves, our heirs,
executors, administrators, successors and assigns, jointly and severally, firmly by these present.

This Construction Performance Bond ("Bond") is entered into by and between the undersigned parties to
ensure the faithful performance of the Construction Contract listed below.

OWNER

Anchorage School District
4919 Van Buren Street
Anchorage, Alaska 99517

CONSTRUCTION PROJECT

Solicitation No.: _____
Location: _____

BOND

Number: _____
Date: _____
Amount: _____

CONSTRUCTION CONTRACT

Number: _____
Date: _____
Amount: _____

CONTRACTOR

Name: _____
Address: _____
City/State: _____

SURETY

Name: _____
Address: _____
City/State: _____

PERFORMANCE BOND AND PAYMENT BOND

Division 0
Section 00620

IN TESTIMONY WHEREOF, the parties hereunto have caused the execution hereof of two (2) original counterparts as the _____ day of _____, 20_____.

PRINCIPAL

Contractor Name

Signature

Typed Name and Title

SURETY

Corporate Surety Name (Seal)

Signature

Typed Name, Attorney-in-fact

WITNESS AS TO PRINCIPAL

Note: Attach Power of Attorney for Surety Signator.

CONSTRUCTION PERFORMANCE BOND TERMS AND CONDITIONS

1. The CONTRACTOR and the SURETY, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER for the complete and proper performance of the Construction Contract, which is incorporated herein by reference.
2. If the CONTRACTOR completely and properly performs all of its obligations under the Construction Contract, the SURETY and the CONTRACTOR shall have no obligation under this Bond.
3. If there is no OWNER Default, the SURETY's obligation under this Bond shall arise after:
 - a. OWNER has declared a CONTRACTOR Default under the Construction Contract pursuant to the terms of the Construction Contract; and
 - b. The OWNER has agreed to pay the Balance of the Contract Sum to:
 - i. The SURETY in accordance with the terms of this Bond and the Construction Contract; or
 - ii. A contractor selected to perform the Construction Contract in accordance with the terms of this Bond and the Construction Contract.
4. When the OWNER has satisfied the conditions of Paragraph 3, the SURETY shall promptly (within thirty (30) days) and at the SURETY's expense elect to take one of the following actions:
 - a. Arrange for the CONTRACTOR, with consent of the OWNER, to perform and complete the Construction Contract (but OWNER may withhold consent, in which case the SURETY must election option 4b, 4c or 4d, below); or
 - b. Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors; or
 - c. Obtain bids from qualified contractors acceptable to OWNER for a contract for performance and completion of the Construction Contract, and, upon determination by OWNER of the lowest responsive and responsible bidder, arrange for a contract to be prepared for execution by OWNER and the contractor selected with OWNER's concurrence, to be secured with performance and payment bonds executed by a qualified SURETY equivalent to the bonds issued on the Construction Contract; and, if the SURETY's obligations defined in Paragraph 6 exceed the Balance of the Contract Sum, then the SURETY shall pay to OWNER the amount of such excess; or
 - d. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and, with reasonable promptness under the circumstances and after investigation and consultation with OWNER, determine in good faith the amount for which it may then be liable to OWNER under Paragraph 6 for the performance and completion of the Construction Contract and, as soon as practicable after the amount is determined, tender payment therefore to OWNER with full explanation of the payment's calculation. If OWNER accepts the SURETY's tender under this paragraph 4.d, OWNER may still hold SURETY liable for future damages then unknown or unliquidated resulting from the CONTRACTOR Default. If OWNER disputes the amount of the SURETY's tender under this paragraph 4.d, OWNER may exercise all remedies available to it at law to enforce the SURETY's liability under paragraph 6.

5. If the SURETY does not proceed as provided in Paragraph 4, then the SURETY shall be deemed to be in default on this Bond ten (10) days after receipt of an additional written notice from OWNER to the SURETY demanding that the SURETY perform its obligations under this Bond. At all times OWNER shall be entitled to enforce any remedy available to OWNER at law or under the Construction Contract including, without limitation, and by way of example only, rights to perform work, protect work, mitigate damages, or coordinate work with other consultants or contractors.
6. The SURETY's monetary obligation under this Bond is limited by the amount of this Bond. Subject to these limits, the SURETY's obligations under this Bond are commensurate with the obligations of the CONTRACTOR under the Construction Contract. The SURETY's obligations shall include but are not limited to:
 - a. The responsibilities of the CONTRACTOR under the Construction Contract for completion of the Construction Contract and correction of defective work;
 - b. The responsibilities of the CONTRACTOR under the Construction Contract to pay liquidated damages, and for damages for which no liquidated damages are specified in the Construction Contract, actual damages caused by non-performance of the Construction Contract, including but not limited to, all valid and proper back charges, offsets, payments, indemnities or other damages;
 - c. Additional legal, design professional and delay costs resulting from the CONTRACTOR Default or resulting from the actions or failure to act of the SURETY under Paragraph 4.
7. No right of action shall accrue on this Bond to any person or entity other than OWNER or its heirs, executors, administrators, or successors.
8. The SURETY hereby waives notice of any change, alteration or addition to the Construction Contract or to related subcontracts, purchase orders and other obligations, including changes of time. The SURETY consents to all terms of the Construction Contract, including provisions on changes to the Contract. No extension of time, change, alteration, modification, deletion, or addition to the Contract Documents, or of the work required thereunder, shall release or exonerate SURETY on this Bond or in any way affect the obligations of SURETY on this Bond.
9. Any proceeding, legal or equitable, under the Bond shall be instituted in the Superior Court for the State of Alaska, Third Judicial District.
10. Notice to the SURETY, OWNER or the CONTRACTOR shall be mailed or delivered to the address shown on the front page.
11. Any provision in this Bond conflicting with any statutory or regulatory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein.
12. Definitions.
 - a. Balance of the Contract Sum: The total amount payable by OWNER to the CONTRACTOR pursuant to the terms of the Construction Contract after all proper adjustments have been made under the Construction Contract, for example, deductions for progress payments made, and increases/decreases for approved modifications to the Construction Contract.
 - b. Construction Contract: The agreement between OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.

PERFORMANCE BOND AND PAYMENT BOND

Division 0

Section 00620

- c. CONTRACTOR Default: Material failure of the CONTRACTOR which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract, including but not limited to, the provisions of Article 14 of the General Conditions of the Construction Contract.
- d. OWNER Default: Material failure of OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR progress payments due under the Construction Contract or to perform other material terms of the Construction Contract, if such failure is the cause of the asserted CONTRACTOR Default and is sufficient to justify CONTRACTOR termination of the Construction Contract.

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENT that we, _____ as
Contractor

PRINCIPAL, and _____ a corporation duly organized under the laws
Surety

of the State of _____, as SURETY/OBLIGOR authorized to transact surety business in the
state of Alaska, are held and firmly bound unto the ANCHORAGE SCHOOL DISTRICT, as OBLIGEE, in
the amount

of _____ Dollars

(\$ _____), for payment whereof PRINCIPAL and SURETY bind ourselves, our heirs,
executors, administrators, successors and assigns, jointly and severally, firmly by these present.

This Payment Bond ("Bond") is entered into by and between the undersigned parties to ensure the faithful
performance of the Construction Contract listed below.

OWNER

Anchorage School District
4919 Van Buren Street
Anchorage, Alaska 99517

CONSTRUCTION PROJECT

Solicitation No.: _____
Location: _____

BOND

Number: _____
Date: _____
Amount: _____

CONSTRUCTION CONTRACT

Number: _____
Date: _____
Amount: _____

CONTRACTOR

Name: _____
Address: _____
City/State: _____

SURETY

Name: _____
Address: _____
City/State: _____

PERFORMANCE BOND AND PAYMENT BOND

Division 0
Section 00620

IN TESTIMONY WHEREOF, the parties hereunto have caused the execution hereof of two (2)
original counterparts as the _____ day of _____, 20_____.

PRINCIPAL

Contractor Name

Signature

Typed Name and Title

SURETY

Corporate Surety Name (Seal)

Signature

Typed Name, Attorney-in-fact

WITNESS AS TO PRINCIPAL

Note: Attach Power of Attorney for Surety Signator.

PAYMENT BOND TERMS AND CONDITIONS

The condition of this obligation is such that if the PRINCIPAL shall promptly make payment to all Claimants who furnish labor or materials in the prosecution of the Work provided for in the Construction Contract, then this obligation shall be void; otherwise, it shall remain in full force and effect.

This Bond has been furnished to comply with Alaska Statute 36.25.010, and to allow enforcement rights pursuant to Alaska Statute 36.25.020. Any provisions in this Bond conflicting with said statutory requirements shall be deemed deleted herefrom and provisions conforming to such statutory requirements shall be deemed incorporated herein.

The SURETY hereby waives notice of any change, alteration or addition to the Construction Contract or to related subcontracts, purchase orders and other obligations, including changes of time. The SURETY consents to all terms of the Construction Contract, including provisions on changes to the Contract. No extension of time, change, alteration, modification, deletion, or addition to the Contract Documents, or of the work required thereunder, shall release or exonerate SURETY on this Bond or in any way affect the obligations of SURETY on this Bond.

END OF SECTION

SAMPLE FORMS AND CERTIFICATES

A.GENERAL

A.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Comply with the contract conditions requirements and specified administrative procedures in closing-out work.

A.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Section 01700: Project Close-out
- B. General and Supplementary General Conditions

A.03 APPLICATION AND CERTIFICATE FOR PAYMENT

- A. Use Anchorage School District Form 100, 100A, 100B, and 100C attached herein.

A.04 CERTIFICATION OF SUBSTANTIAL COMPLETION

- A. Use Anchorage School District Form 101 attached herein.

A.05 CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS

- A. Use Anchorage School District Form 102 attached herein.

A.06 RELEASE ON CONTRACTS

- A. Use Anchorage School District Form 103 attached herein.

A.07 CONSENT OF SURETY COMPANY TO FINAL PAYMENT

- A. Use Anchorage School District Form 104 attached herein.

A.08 CONSENT OF SURETY TO REDUCTION IN OR PARTIAL RELEASE OF RETAINAGE

- A. Use Anchorage School District Form 105 attached herein.

A.09 CERTIFICATES OF INSURANCE

- A. The contractor's Certificate of Insurance shall be on an industry standard form with, as a minimum, the categories and clauses on the Accord form with contractual clauses for contract number and description, subrogation waiver, additional insured and cancellation notification.

A.10 REQUEST FOR INFORMATION

- A. Contractor's requests for information shall be on Anchorage School District request for information forms.

A.11 PRIME CONTRACT POTENTIAL CHANGE ORDER (PCO)

A. Proposals will be executed on Anchorage School District PCO forms.

A.12 CERTIFICATE OF COMPLIANCE

A. The Contractor shall submit a notarized Certificate of Compliance, contained in this section, with his application for Final Payment.

A.13 WARRANTY OF WORK

A. The Contractor shall furnish to the Owner a notarized Warranty of Work after Final Payment, contained in this section, with his application for Final Payment.

A.14 AHERA EXCLUSION DOCUMENT

A. The Contractor shall furnish to the Owner a signed AHERA Exclusion Document, contained in this section, with his application for Final Payment.

A.15 PRIME CONTRACT CHANGE ORDER (PCCO)

A. Change Orders/Contract Modifications will be executed on Anchorage School District PCCO forms.

A.16 CONTRACTOR'S QUALITY CONTROL REPORT (CQC)

A. The Contractor shall complete the CQC Report in accordance with Section 01400.

A.17 DEPARTMENT OF LABOR NOTICE OF WORK

A. The Contractor shall furnish to the Department of Labor a Notice of Work prior to start of construction.

A.18 DEPARTMENT OF REVENUE TAX CLEARANCE REQUEST FORM

A. For projects funded through the Department of Education (debt reimbursement or DEED grants), the Contractor shall furnish to the Owner a Tax Clearance Request Form approved by the Department of Revenue, contained in this section, with his application for Final Payment.

A.19 DEPARTMENT OF LABOR TAX CLEARANCE REQUEST FORM

A. For projects funded through the Department of Education (debt reimbursement or DEED grants), the Contractor shall furnish to the Owner a Tax Clearance Request Form approved by the Department of Labor, contained in this section, with his application for Final Payment.

A.20 SUBMITTAL CONTROL FORM

A. Submittals will be executed on Anchorage School District Submittal Control Forms.

A.21 STATE OF ALASKA SEX OFFENDER/CHILD KIDNAPPER REGISTRY CONTRACTOR CERTIFICATION

A. Contractor certifies contractor is familiar with and is in compliance with Anchorage School Board Policy 3515.5, that no employee or agent of contractor who will be on district property is registered as a sex offender or child kidnapper in Alaska [Alaska Department of Public Safety “Sex Offender/Child Kidnapper Registry”] or in any other state in which the employee or agent previously lived or worked, and that, to contractors knowledge, no employee or agent is a convicted sex offender or child kidnapper.

A.22 STATE OF ALASKA SEX OFFENDER/CHILD KIDNAPPER REGISTRY SUBCONTRACTOR CERTIFICATION

A. Subcontractor certifies subcontractor is familiar with and is in compliance with Anchorage School Board Policy 3515.5, that no employee or agent of subcontractor who will be on district property is registered as a sex offender or child kidnapper in Alaska [Alaska Department of Public Safety “Sex Offender/Child Kidnapper Registry”] or in any other state in which the employee or agent previously lived or worked, and that, to subcontractors knowledge, no employee or agent is a convicted sex offender or child kidnapper.

A.23 STATE OF ALASKA SEX OFFENDER/CHILD KIDNAPPER REGISTRY SUB-SUBCONTRACTOR CERTIFICATION

A. Sub-subcontractor certifies sub-subcontractor is familiar with and is in compliance with Anchorage School Board Policy 3515.5, that no employee or agent of sub-subcontractor who will be on district property is registered as a sex offender or child kidnapper in Alaska [Alaska Department of Public Safety “Sex Offender/Child Kidnapper Registry”] or in any other state in which the employee or agent previously lived or worked, and that, to sub-subcontractors knowledge, no employee or agent is a convicted sex offender or child kidnapper.

A.24 LIST OF FEDERALLY REGISTERED ALASKAN APPRENTICESHIP PROGRAMS

A. This list from the Federal Department of Labor will provide contractors with the list Alaskan apprenticeship programs and crafts/trades categories that are subject to ASD’s AUP.

A.25 APPRENTICESHIP UTILIZATION FORM

A. The Prime Contractor will list the crafts/trades categories required to complete the project that have Alaskan Federally Registered Apprenticeship Programs. This list will include all crafts/trades categories for both the prime and subcontractors.

A.26 APPRENTICESHIP UTILIZATION PROGRAM CALCULATION FROM

A. This form will be submitted by the prime contractors to demonstrate compliance with the apprenticeship utilization percentage for both prime and subcontractors on the project.

A.27 PENALTY TABLE

A. This table lists the penalties for non-compliance with the AUP.

ANCHORAGE SCHOOL DISTRICT APPLICATION FOR PAYMENT																							
Project Name: ITB/RFP No. : Name of Contractor: Address:	Contract #: Application #: Application date: Period to:																						
<p>COMPUTATION OF PAYMENT DUE</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">(a) Original contract amount (ASD 100A)</td> <td style="width: 20%; text-align: right;">\$ -</td> </tr> <tr> <td>(b) Net Change by Change Orders (ASD 100B)</td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td>(c) Adjusted contract amount to date (a+b)</td> <td style="text-align: right;">-</td> </tr> <tr> <td>(d) Work Completed to Date (ASD 100B)</td> <td style="text-align: right;">-</td> </tr> <tr> <td>(e) Materials Stored (ASD 100B)</td> <td style="text-align: right;">-</td> </tr> <tr> <td>(f) Total Completed and Stored To Date (d+e)</td> <td style="text-align: right;">-</td> </tr> <tr> <td>(g) Less: amount retained in accordance with contract terms</td> <td style="text-align: right;">-</td> </tr> <tr> <td>(h) Net amount earned on contract work to date (f-g)</td> <td style="text-align: right;">-</td> </tr> <tr> <td>(i) Less: amount of previous payments (ASD 100B)</td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td>(j) CURRENT PAYMENT DUE (h-i)</td> <td style="text-align: right; border: 2px solid black;">\$ -</td> </tr> <tr> <td>(k) Balance to Finish (c-h)</td> <td style="text-align: right;">\$ -</td> </tr> </table>		(a) Original contract amount (ASD 100A)	\$ -	(b) Net Change by Change Orders (ASD 100B)	\$0.00	(c) Adjusted contract amount to date (a+b)	-	(d) Work Completed to Date (ASD 100B)	-	(e) Materials Stored (ASD 100B)	-	(f) Total Completed and Stored To Date (d+e)	-	(g) Less: amount retained in accordance with contract terms	-	(h) Net amount earned on contract work to date (f-g)	-	(i) Less: amount of previous payments (ASD 100B)	\$0.00	(j) CURRENT PAYMENT DUE (h-i)	\$ -	(k) Balance to Finish (c-h)	\$ -
(a) Original contract amount (ASD 100A)	\$ -																						
(b) Net Change by Change Orders (ASD 100B)	\$0.00																						
(c) Adjusted contract amount to date (a+b)	-																						
(d) Work Completed to Date (ASD 100B)	-																						
(e) Materials Stored (ASD 100B)	-																						
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(g) Less: amount retained in accordance with contract terms	-																						
(h) Net amount earned on contract work to date (f-g)	-																						
(i) Less: amount of previous payments (ASD 100B)	\$0.00																						
(j) CURRENT PAYMENT DUE (h-i)	\$ -																						
(k) Balance to Finish (c-h)	\$ -																						
<p>CERTIFICATION OF CONTRACTOR</p> <p>According to the best of my knowledge and belief, I certify that all items and amounts shown on the face of this Application for Payment are correct; that all work has been performed and/or material supplied in full accordance with the requirements of the referenced Contract, and/or duly authorized deviations, substitutions, alterations, and/or additions; that payment has been made for all materials received and work performed for which previous pay applications were approved; that no part of the "Balance Due This Payment" has been received and that it is currently due.</p> <p style="text-align: right;">By _____ (Contractor) _____ (Signature of Authorized Representative)</p> <p style="text-align: right;">Date _____ Title: _____</p>																							
<p>CERTIFICATION OF ARCHITECT</p> <p>According to the best of my knowledge and belief, and based on on-site observations, I certify that the work completed as shown on ASD 100B has progressed as indicated, the quality of work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the Current Payment Due shown above.</p> <p style="text-align: right;">Date _____ (Signature of Architect)</p>																							
<p>APPROVED FOR PAYMENT</p> <p style="text-align: right;">Date _____ (ASD Project Manager)</p>																							

ASD 100 (1/15)

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project: _____ Contract Number: _____

Contractor: _____ Contract Date: _____

Architect: _____ Date of Issuance: _____

Owner: ANCHORAGE SCHOOL DISTRICT
1301 Labar Street
Anchorage, Alaska 99515

Project Description:

The work performed under this contract has been reviewed and found to be substantially complete. The date of Substantial Completion is hereby established as: _____

Definition of Date of Substantial Completion:

The date of substantial completion of the project is the date certified by the Owner when the work is substantially complete in accordance with, and defined in the Contract Documents.

A list of items to be completed or corrected, prepared by the Owner and verified and amended by the Architect is appended hereto. The failure to include any items or such list does not alter the responsibility of the Contractor to complete the project in accordance with the Contract Documents.

The Contractor will complete or correct the work on the list of items appended hereto within 30 days from the date of substantial completion.

The responsibilities of the Owner and the Contractor for maintenance, heat, utilities, and insurance shall be as follows: _____

In reliance upon the certification of the Contractor and the Architect, the Owner hereby accepts the project as substantially complete. In accordance with the Contract Documents, the Owner hereby elects to assume occupancy of _____

_____ at _____ a.m./p.m. on
_____.

Owner: **ANCHORAGE SCHOOL DISTRICT**

By: _____ Title: _____ Date: _____

Architect: _____

By: _____ Title: _____ Date: _____

Contractor: _____

By: _____ Title: _____ Date: _____

ASD 101 (01/03)

**CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS
ANCHORAGE SCHOOL DISTRICT**

WHEREAS, by the terms of a contract dated _____ entered into by the
Anchorage School District, and _____ for the construction of

The undersigned, pursuant to the General Conditions of the Contract for the construction,
_____, hereby certifies that, except as listed below, he has paid
in full or has otherwise satisfied all obligations for all materials and equipment furnished, for all work, labor, and services
performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in
connection with the performance of the Contract referenced above for which the District or his property might in any way
be held responsible.

EXCEPTIONS:

IN WITNESS WHEREOF, the seal of the undersigned Contractor have been hereunto set this

day of

, at

By

being first duly sworn, say that I am the agent for and executed
the foregoing under authority of said company to do so; that I have read the same, know the contents thereof, and the
matters set forth therein are as I truly believe.

By

Subscribed and sworn to before me this _____ day of

, at _____

Notary Public in and for _____

My Commission Expires _____

RELEASE ON CONTRACT
ANCHORAGE SCHOOL DISTRICT

WHEREAS, by the terms of a contract dated _____ entered into by the Anchorage School District, and _____ for the construction of _____,

it is provided that:

"Neither the final payment nor the remaining retained percentage shall become due until the Contractor shall provide the Owner (1) with a waiver and release of liens, on the forms provided by the Owner, executed by the Contractor..."

NOW THEREFORE, in consideration of the premises and the payment by the Anchorage School District to the undersigned Contractor of the amounts due under the contract and any changes or modifications thereto, to wit, the sum

of \$ _____ Dollars,
(Numbers) (In Words)

the undersigned Contractor hereby releases and forever discharges the Anchorage School District including its property, particularly that real property known as the _____

of the Anchorage School District, of and from all manner of debts, dues and sum or sums of money, accounts, claims, and demands whatsoever, in Law and in equity, under or by virtue of said contract, and warrants good title to all material, supplies and equipment installed or incorporated in the project and all work delivered to the premises, together with all improvements and appurtenances constructed thereon by:

_____ to the Anchorage School District free of any claims, liens or encumbrances. Neither the undersigned nor any person, firm or corporation furnishing material or labor for any work covered by this Contract has any right to a lien upon the premises nor improvement thereon, except:

—

IN WITNESS WHEREOF, the signature of the undersigned Contractor has been hereunto set this

_____ day of _____, 20____, at _____, Alaska.

Signature: _____

Printed Name: _____

I, _____, being first duly sworn, say that I am the agent for and executed the foregoing under authority of said company to do so; that I have read the same, know the contents thereof, and the matters set forth therein are as I truly believe.

Signature: _____

Subscribed and sworn to before me this _____ day of _____, 20____, at _____, Alaska.

Notary Public in and for _____

My Commission Expires: _____.

CONSENT OF SURETY COMPANY
TO FINAL PAYMENT

PROJECT: _____

PROJECT NUMBER: _____

CONTRACTOR: _____

CONTRACT DATE: _____

TO: Anchorage School District

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above:

_____ (Surety Company)

on bond of

_____ (Contractor)

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety Company of any of its obligations to Anchorage School District, Owner as set forth in said Surety Company's bond. Surety expressly agrees that any and all valid claims of sub-Contractors and all persons supplying labor or materials to the project will be satisfied by Contractor or Surety in a timely manner

IN WITNESS WHEREOF, the Surety Company has hereunto set its hand this

_____ day of _____, 20__.

Name of Surety Company

Attest

Signature of Authorized Representative

Title

**CONSENT OF SURETY TO REDUCTION IN OR PARTIAL RELEASE OF RETAINAGE
ANCHORAGE SCHOOL DISTRICT**

PROJECT:

PROJECT NUMBER:

TO: Anchorage School District

CONTRACT DATE:

CONTRACTOR:

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above,
the:

_____ (Surety Company)

on bond of

_____ (Contractor)

HEREBY APPROVES OF THE REDUCTION IN OR PARTIAL RELEASE OF RETAINAGE to the Contractor
as follows:

The surety agrees that such reduction in or partial release of retainage to the Contractor shall not relieve the
Surety of any of its obligations to **ANCHORAGE SCHOOL DISTRICT, OWNER**

IN WITNESS WHEREOF, the Surety Company has hereunto set its hand this
day of .


Name of Surety Company

Attest

Signature of Authorized Representative

Title

ASDF Form 105

	CERTIFICATE OF LIABILITY INSURANCE	DATE (MM/DD/YYYY)
PRODUCER	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.	
INSURED	INSURERS AFFORDING COVERAGE	NAIC #
	INSURER A:	
	INSURER B:	
	INSURER C:	
	INSURER D:	
	INSURER E:	

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR	ADD'L	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	LIMITS								
		GENERAL LIABILITY <input type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC				EACH OCCURRENCE \$ DAMAGE TO RENTED PREMISES (Ea occurrence) \$ MED EXP (Any one person) \$ PERSONAL & ADV INJURY \$ GENERAL AGGREGATE \$ PRODUCTS - COMP/OP AGG \$								
		AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS				COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$								
		GARAGE LIABILITY <input type="checkbox"/> ANY AUTO				AUTO ONLY - EA ACCIDENT \$ OTHER THAN AUTO ONLY: EA ACC \$ AGG \$								
		EXCESS / UMBRELLA LIABILITY <input type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> DEDUCTIBLE <input type="checkbox"/> RETENTION \$				EACH OCCURRENCE \$ AGGREGATE \$ \$ \$ \$								
		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) <input type="checkbox"/> Y/N If yes, describe under SPECIAL PROVISIONS below				<table border="0" style="width:100%; font-size: x-small;"> <tr> <td style="width:50%;"><input type="checkbox"/> WC STATU-TORY LIMITS</td> <td style="width:50%;"><input type="checkbox"/> OTH-ER</td> </tr> <tr> <td>E.L. EACH ACCIDENT</td> <td>\$</td> </tr> <tr> <td>E.L. DISEASE - EA EMPLOYEE</td> <td>\$</td> </tr> <tr> <td>E.L. DISEASE - POLICY LIMIT</td> <td>\$</td> </tr> </table>	<input type="checkbox"/> WC STATU-TORY LIMITS	<input type="checkbox"/> OTH-ER	E.L. EACH ACCIDENT	\$	E.L. DISEASE - EA EMPLOYEE	\$	E.L. DISEASE - POLICY LIMIT	\$
<input type="checkbox"/> WC STATU-TORY LIMITS	<input type="checkbox"/> OTH-ER													
E.L. EACH ACCIDENT	\$													
E.L. DISEASE - EA EMPLOYEE	\$													
E.L. DISEASE - POLICY LIMIT	\$													
		OTHER												

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

CERTIFICATE HOLDER	CANCELLATION
	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL _____ DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES. AUTHORIZED REPRESENTATIVE

IMPORTANT

If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

DISCLAIMER

This Certificate of Insurance does not constitute a contract between the issuing insurer(s), authorized representative or producer, and the certificate holder, nor does it affirmatively or negatively amend, extend or alter the coverage afforded by the policies listed thereon.

ACORD 25 (2009/01)

Anchorage School District

REQUEST FOR INFORMATION

Facilities Maintenance
1301 Labar Street
Anchorage, Alaska 99515

Phone: (907) 348-5215
Fax: (907) 348-5227

No.

TITLE:

DATE:

PROJECT:

Project No.:

TO:

REQUEST:

ANSWER:

Answered By: _____

Printed Name

Signature

Date

This is not an authorization to proceed with any work involving additional cost and / or time.
Notification must be given in accordance with Contract Documents if any clarification, variation or Architects/Engineers responses cause any change to the Contract Documents.

ANCHORAGE SCHOOL DISTRICT USE ONLY:

Is this Request for Information associated with an Request for Proposal?

Reviewed By: _____

Yes ___ No ___

Signed: _____
Project Manager

Date: _____

Request for Proposal # _____



Capital Planning & Construction
 1301 Labar St
 Anchorage, Alaska 99515
 Phone: (907) 348-5284
 Fax: (907) 348-5227

Project:

PCO #XXX

Prime Contract Potential Change Order #XXX: Name

TO:	FROM:
PCO NUMBER/REVISION:	CONTRACT:
REQUEST RECEIVED FROM:	CREATED BY:
STATUS:	CREATED DATE:
REFERENCE:	PRIME CONTRACT CHANGE ORDER:
FIELD CHANGE:	CHANGE ORDER REQUEST:
LOCATION:	ACCOUNTING METHOD:
SCHEDULE IMPACT:	PAID IN FULL:
CHANGE REASON:	TOTAL AMOUNT:

Within seven (7) days, submit an itemized proposal.

Provide labor, material, equipment, and supervision necessary to complete changes to project as represented by the documentation indicated below. The quoted price shall include all direct and indirect costs (additive and deductive) associated with and resulting from this work, per the General Conditions of the Contract. Provide lump sum proposal properly itemized and supported by sustaining data to permit evaluation. The quoted price shall be considered full compensation and include all delay, impact, and actual cost associated with the resulting changes from this extra work.

POTENTIAL CHANGE ORDER DESCRIPTION: *(The Contract Is Changed As Follows)*

ATTACHMENTS:

APPROVAL

By: _____	Date _____	By: _____	Date _____
Project Manager		Contractor	
By: _____		By: _____	
Construction Supervisor		Senior Director of CP&C	
Date: _____		Date: _____	
Required if amount exceeds \$10,000		Required if amount exceeds \$50,000	

CERTIFICATE OF COMPLIANCE

No final payment shall be made until the Contractor shall file with the Owner, prior to acceptance of the work, a notarized Certification of Compliance in the following form:

The Contractor does hereby certify that all work has been performed and materials supplied in accordance with the Drawings, Specifications and Contract Documents for the above work, and that:

No less than the prevailing rates of wages as ascertained by the governing body of the Contracting Agency has been paid to laborers, workmen and mechanics employed on this work;

There have been no unauthorized substitutions of Subcontractors; nor have any subcontracts been entered into without prior notice having been submitted to the Owner prior to the start of such subcontracted work;

No subcontract was assigned or transferred or performed by any Subcontractor other than the original Subcontractor, without prior notice having been submitted to the Owner together with the names of all Subcontractors;

All claims for material and labor and other paid service performed in connection with these specifications have been paid;

All monies due the State Industrial Accident Fund, the State Unemployment Compensation Trust Fund, the State Tax Commission, Hospital Associations and/or others have been paid.

In WITNESS WHEREOF, the undersigned has signed and sealed this instrument this

_____ day of _____, 20__.

(Firm Name)

(Signature)

(Title)

(Attest)

(SEAL IF BIDDER IS A CORPORATION)

As determined necessary, evidence of compliance may be required to be submitted with and made a part of this Certificate of Compliance.

WARRANTY OF WORK

Prior to Final Payment, the Contractor shall furnish to the Owner a Warranty of Work in the following form:

The Contractor does hereby warrant all work and materials to be in full and complete accordance with the Contract Documents and Agreement between Owner and Contractor, and requirements appertaining thereto; that all work and materials are free from any and all defects and imperfections, and fully suitable for the use and purposes for which each and every part is intended. The Contractor also agrees that, should any defect develop or appear which the Project Manager or Owner's Representative finds was Not caused by improper use, the Contractor shall promptly, upon demand, fully correct, substitute and make good any such defective material without any cost to the Owner and will save the Owner harmless against any claim, demand, loss or damage by reason of any breach of this warranty.

The period of this warranty shall commence on the date of Substantial Completion.

The warranty shall continue to be in full force and effect for the period of one (1) year, except for those items for which a longer period of warranty is specifically stated in the Warranties for work in Technical Sections of the Specifications.

Warranties for work stated in Technical Section shall continue in full force and effect for the respective periods expressly stated.

In WITNESS WHERE, the undersigned has signed and sealed this instrument this

_____ day of _____, 20__.

(Firm Name)

(Signature)

(Title)

(Attest)

(SEAL IF BIDDER IS A CORPORATION)

AHERA Exclusion Document

Contractor's Verification of Asbestos-Free Construction

Project: _____ **Project Number:** _____

Contractor: _____ **Date:** _____

To: Anchorage School District
Facilities Coordinator,
AHERA LEA Designated Person

To the best of our knowledge, no asbestos-containing building materials were installed in this project.

Attest: _____
Signature of Authorized Representative

Title



Capital Planning & Construction
 1301 Labar St
 Anchorage, Alaska 99515
 Phone: (907) 348-5264
 Fax: (907) 348-5227

PCCO #XXX

Project:

Prime Contract Change Order #XXX:

TO:	FROM:
DATE CREATED:	CREATED BY:
CONTRACT STATUS:	REVISION:
DESIGNATED REVIEWER:	REVIEWED BY:
DUE DATE:	REVIEW DATE:
CONTRACTUAL COMPLETION DATE:	
SCHEDULE IMPACT:	EXECUTED:
CONTRACT FOR:	TOTAL AMOUNT:
DESCRIPTION:	
ATTACHMENTS:	

CHANGE ORDER REQUESTS IN THIS CHANGE ORDER:

COR #	Issue	Description	Cost
TOTAL:			\$ 0.00

CHANGE ORDER LINE ITEMS: reason

Original contract sum	\$
Previously authorized change orders	\$
Previous contract amount	\$
Current change order amount	\$
New contract sum	\$
Percent of original contract sum	

Contractor _____ DATE _____

Senior Director of Purchasing/Warehouse _____ DATE _____

SAMPLE FORMS AND CERTIFICATES

Division 0
Section 00630

CONTRACTOR'S QUALITY CONTROL REPORT (CQC)		DATE	REPORT NO.
CONTRACT NO. AND NAME OF CONTRACTOR		DESCRIPTION AND LOCATION OF THE WORK:	
WEATHER CLASSIFICATION:		CLASSIFICATION:	
CLASS A	No interruption of any kind from weather conditions occurring on this or previous shifts.	CLASS _____	
CLASS B	Weather occurred during this shift that caused a complete stoppage of all work.	TEMPERATURE:	
		MAX _____ MIN _____	
CLASS C	Weather occurred during this shift that caused a partial stoppage of work.	PRECIPITATION:	
CLASS D	Weather overhead excellent or suitable during shift. Work completely stopped due to results of previous adverse weather.	INCHES _____	
CLASS E	Weather overhead excellent or suitable during shift but work partially stopped due to previous adverse manner.		
OTHER	Explain.		
CONTRACTOR/SUBCONTRACTORS AND AREA OF RESPONSIBILITY FOR WORK PERFORMED TODAY: (Attach list of items of equipment either idle or working as appropriate.)			
a. _____			
b. _____			
c. _____			
d. _____			
e. _____			
f. _____			
g. _____			
h. _____			
1. WORK PERFORMED TODAY: (Indicate location and description of work performed. Refer to work performed by prime and/or subcontractors by letter in Table above.)			
2. TYPE AND RESULTS OF INSPECTION: (Indicate whether P-Preparatory, I-Initial, or F-Follow-up and include satisfactory work completed or deficiencies with action to be taken.)			

3. TESTS REQUIRED BY PLANS AND/OR SPECIFICATIONS PERFORMED AND RESULTS OF TESTS:
4. QUALITY CONTROL REPORTS (items requiring special inspections):
5. VERBAL INSTRUCTIONS RECEIVED: (List any instructions given by Owner on construction deficiencies, retesting required, etc., with action to be taken.)
6. REMARKS: (Cover any conflicts in plans, specification or instructions: acceptability of incoming materials; offsite surveillance activities; progress of work, delays, causes and extent thereof; days of no work with reasons for same.)
CONTRACTOR'S CERTIFICATION: I certify that the above report is complete and correct and that all material and equipment used, work performed and tests conducted during this reporting period were in strict compliance with the contract plans and specifications except as noted above. <p style="text-align: right;">_____ CONTRACTOR'S APPROVED AUTHORIZED REPRESENTATIVE</p>

Department of Labor and Workforce Development
Labor Standards and Safety Division
Wage and Hour Administration
www.labor.state.ak.us/lss/lss.htm

NOTICE OF WORK

- This form must be typed or printed in ink.
- Fill in all blanks or form will be returned for correction (see back).
- Please allow a minimum of 10 working days for processing.

ENTER YOUR FAX # _____
AND LIST YOUR MAILING ADDRESS BELOW

Contractor, company or agency name, address, city, state & ZIP + 4

Filing Fee Required

Project name	
Specific site description	
Contract awarding agency	
Address	
City	State ZIP + 4
Contract awarding agency contact person	Phone #
Location and city where work is to be performed	
Date work to begin (m/d/y)	Do you intend to use subcontractors? <input type="checkbox"/> Yes <input type="checkbox"/> No
Final Bid Date	Contract #

Primary contractor (has contract with the public agency)		
List all contractors & subcontractors (Attach extra sheet if necessary)	Type of work	Amount of subcontract

CERTIFICATION: I hereby certify that the above information is correct. Enclosed is the filing fee computed at 1% of the total amount of all my subcontractors on this project. This amount includes the contract value for the primary contractor. I understand that the maximum fee I am required to pay is \$5,000. I further certify that all contractors shall be made aware of the requirements of AS 36.05.010 - .110 and AS 36.10.007 - .990 before working.

Total value of subcontracts	\$
Value of work performed by primary contractor	\$
Amount subject to fee	\$
	Multiply by .01
Total fee enclosed =	\$
ROUND FEES TO NEAREST DOLLAR	

Signature _____ Date _____
Title _____
Fax # _____ Phone # _____

For Dept. Use Only

Accepted:

By _____
Department of Labor and Workforce Development

For Dept. Use Only

Amount: _____ Check Number: _____ Cash _____
Received By: _____ Date: _____
Credit Card Confirmation _____
Visa _____ MC _____
Project Name _____
DOLWD Project # _____

Wage & Hour date-stamped copy of this form will serve as temporary receipt.

How to expedite the processing of your form:

Acceptance of this notice will be based on the information provided by the primary contractor.

ERRORS THAT CAUSE REJECTION

No fee included or incorrect amount. If total contract amount is less than \$25,000 no filing fee is required. Contract amounts paid to owner/operators with no employees are exempt from the fee. **The maximum total filing fee for any one project is \$5,000.00.**

Missing – Enter the “time and materials” if applicable. The exact dollar amount will be required on the Notice of Completion to be filed when the project is done.

Missing – The name of each subcontractor and the amount or estimated amount of the subcontract is required. Enter the “time and materials” if applicable. The exact dollar amount will be required on the Notice of Completion to be filed when the project is done.

Missing – Notice of Work must be signed by an authorized representative.

FILING INSTRUCTIONS

If there is not enough space to list all contractor/subcontractor information, attach additional sheets.

A Wage and Hour Administration (WH) date-stamped copy of this form will serve as a temporary receipt, while the acceptance of fees is processed. WH will mail or fax the accepted copy of this notice to the organization provided on the front of this form. Make a copy for your records. This will serve as your notice that the fees paid have been accepted by WH.

For questions call the nearest WH office:

Juneau: (907) 465-4842 Anchorage: (907) 269-4900 Fairbanks: (907) 451-2886

For more forms, see www.labor.state.ak.us/lss/lssforms.htm

Submit the notice and the appropriate filing fee to:

Alaska Department of Labor and Workforce Development
Wage and Hour Administration
P.O. Box 107021
Anchorage, AK 99510-0721

If no fee is required, you may fax the notice to (907) 269-4915

**Alaska Department of Revenue
TAX CLEARANCE REQUEST FORM**

Applicant's Name: _____

EIN/SSN: _____

Mailing Address: _____

City/State/Zip Code: _____

I hereby authorize the Alaska Department of Revenue to release to

(Name of Department or Agency)

Department's Statute on tax clearance: _____

whose facsimile number or email address is _____

confirmation that all taxes, penalties and interest due the Department of Revenue have been paid and that there are no outstanding amounts due.

Signed: _____

Printed Name: _____

Title*: _____

*If tax clearance is being requested on behalf of a corporation/LLC/partnership, must be signed by an officer/member/partner.

Send completed form by email to the Department of Revenue at DOR.tax.accounting@alaska.gov

<i>DEPARTMENT USE ONLY</i>	
<input type="checkbox"/>	<i>The above applicant is current on all taxes, penalties and interest due and is in good standing with the Alaska Department of Revenue.</i>
<input type="checkbox"/>	<i>The above applicant is not current on all taxes, penalties and interest due and is not in good standing with the Alaska Department of Revenue.</i>
_____ <i>Department of Revenue Representative</i>	_____ <i>Date</i>

TaxClearanceRequestForm (Rev 2/21)



THE STATE
of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Labor and Workforce
Development

Division of Employment and Training Services
Employment Security Tax

P.O. Box 115509
Juneau, AK 99811-5509
Relay Alaska (in state): (800) 770-8973 or 7.1.1
Relay Alaska (out of state): (800) 770-8255
Toll free: (888) 448-2937
Phone: (907) 465-2787
Fax: (907) 465-2374

Tax Clearance Request Form for Contractors

Date of request: _____

Business name of the contractor a Tax Clearance is being requested for: _____

Business address: _____

Business contact phone number: _____

Federal Identification Number: _____

Alaska Employer Account Number: _____

Specific time period a tax clearance is being requested for (i.e. beginning and ending date of a subcontract agreement):

Subcontract project name: _____

Name and address of the person this Tax Clearance is to be returned to: _____

Comments or additional information: _____

For agency use only:

- Tax Clearance is granted
- Tax Clearance is not granted (please have employer contact the department)
- No account on file, liability unknown (please have employer contact the department)
- Employer has stated no employees, Tax Clearance not required.

Agency representative signature: _____ Date: _____

Agency representative title: _____

We are an equal opportunity employer/program. Auxiliary aids and services are available upon request to individuals with disabilities. labor.alaska.gov/estax

Rev. 8/2018

**STATE of ALASKA SEX OFFENDER/CHILD KIDNAPPER
REGISTRY
CONTRACTOR CERTIFICATION**

Pursuant to Article 1, Subparagraph 1.02, of the Instructions to Bidders, Specification Section 00100, I _____ the undersigned Principal for _____ on Solicitation No. _____, certify:

1. that I, either personally or through a person designated by me, have researched the State of Alaska Sex Offender/Child Kidnapper Registry to confirm that no employee or agent who may enter Anchorage School District property in connection with the contract is listed in the Registry.

2. that I have required all subcontractors and any of their sub-subcontractors to certify, or will require all subcontractors and any of their sub-subcontractors to certify, that they researched the State of Alaska Sex Offender/Child Kidnapper Registry to confirm that no employee or agent who may enter district property in connection with the contract is listed in the Registry. I will provide all such certifications to the district on request.

3. To my knowledge, no employee or agent of bidder, or any sub-contractor or sub-sub-contractor of bidder, who may enter district property in connection with the contract is: (a) listed in the sex offender/child kidnapper registry of any other state; or, (b) is a convicted sex offender or child kidnapper.

4. I have read district Board Policy 3515.5 and certify that the bidder will comply with Board Policy 3515.5. The bidder will not send any employee or agent who is a sex offender or child kidnapper to district property, as that term is defined in Board Policy 3515.5.

By: _____
Signature Printed Name

Title: _____

Dated: _____

Revised April 4, 2018

**STATE of ALASKA SEX OFFENDER/CHILD KIDNAPPER
REGISTRY
SUBCONTRACTOR CERTIFICATION**

Pursuant to Article 1, Subparagraph 1.02, of the Instructions to Bidders, Specification Section 00100, I _____ the undersigned Principal for _____ on Solicitation No. _____, certify:

1. that I, either personally or through a person designated by me, have researched the State of Alaska Sex Offender/Child Kidnapper Registry to confirm that no employee or agent who may enter Anchorage School District property in connection with the contract is listed in the Registry.

2. that I have required all subcontractors and any of their sub-subcontractors to certify, or will require all subcontractors and any of their sub-subcontractors to certify, that they researched the State of Alaska Sex Offender/Child Kidnapper Registry to confirm that no employee or agent who may enter district property in connection with the contract is listed in the Registry. I will provide all such certifications to the district on request.

3. that if my company enters into an agreement to perform work as a Subcontractor for _____ the General Contractor for the district under Solicitation No. _____, my company will not allow any worker whose name appears on the State of Alaska Sex Offender/Child Kidnapper Registry to perform work on or at the Project site.

By: _____
Signature Printed Name

Title: _____

Dated: _____

Revised April 21, 2015

**STATE of ALASKA SEX OFFENDER/CHILD KIDNAPPER
REGISTRY
SUB-SUBCONTRACTOR CERTIFICATION**

Pursuant to Article 1, Subparagraph 1.02, of the Instructions to Bidders, Specification Section 00100, I _____ the undersigned Principal for _____ on Solicitation No. _____, certify:

1. that I, either personally or through a person designated by me, have researched the State of Alaska Sex Offender/Child Kidnapper Registry to confirm that no employee or agent who may enter Anchorage School District property in connection with the contract is listed in the Registry.

2. that if my company enters into an agreement to perform work as a Sub-subcontractor for _____ a Subcontractor for the General Contractor for the district under Solicitation No. _____, my company will not allow any worker whose name appears on the State of Alaska Sex Offender/Child Kidnapper Registry to perform work on or at the Project site.

By: _____
Signature Printed Name

Title: _____

Dated: _____

Revised April 21, 2015

ANCHORAGE SCHOOL DISTRICTS'
LIST OF

ALASKAN FEDERALLY REGISTERED APPRENTICESHIP PROGRAMS

Program Number	Program Name	Program Status	Address	Occupation Title
AK00000003	ABC of Alaska, Inc	Registered	301 Arctic Slope Avenue, Suite 100 ANCHORAGE AK 99518	CARPENTER
AK00000004	ALASKA ACUSTICAL	Registered	902 Warren Street KETCHIKAN AK 99901	CARPENTER
AK00000005	Alaska Carpenters Training Trust	Registered	8751 King Street Anchorage AK 99515	CARPENTER
AK00000006	Collins Construction, Incorporated	Suspended	1151 W. Nugget Avenue Wasilla AK 99554	CARPENTER
AK000125887	Finch Works, LLC	Registered	P.O. Box 521791, Big Lake AK 99652	CARPENTER
AK000126017	H Construction, LLC	Registered	15383 Teelinge Circle Palmer AK 99645	CARPENTER
AK000126010	ICE SERVICES, INCORPORATED	Registered	2606 C STREET, SUITE 2B ANCHORAGE AK 99503	CARPENTER
AK000081120	Woodwright Construction, LLC	Registered	P.O. Box 6235 Ketchikan AK 99901	CARPENTER
AK000030009	YUKON-KUSKOKWIM DELTA APPRENTICESHIP PROGRAM	Registered	P.O. BOX 869 BETHEL AK 99559	CARPENTER
AK000056002	Alaska Carpenters Training Trust	Registered	8751 King Street Anchorage AK 99515	CARPENTER, INTERIOR SYSTEMS (Alternate Title: Interior Systems Carpenter)
AK000070017	Alaska Trowel Trades JATC	Registered	825 East 8th Avenue, Suite 10 Anchorage AK 99501	CARPENTER, PLEDRIVER
AK000125886	Budy Concrete Construction, LLC	Registered	P.O. Box 82061 Fairbanks AK 99708	CEMENT MASON
AK000090003	ABC of Alaska, Inc	Registered	301 Arctic Slope Avenue, Suite 100 ANCHORAGE AK 99518	CONSTRUCTION CRAFT LABORER
AK000194006	Alaska Laborers JATC	Registered	17805 OLD GLENN HWY CHUGIAK AK 99567	CONSTRUCTION CRAFT LABORER
AK000125887	Rock-n-Road Construction, Inc.	Registered	P.O. Box 1188 Petersburg AK 99833	CONSTRUCTION CRAFT LABORER
AK000125884	Wolverine Supply, Inc.	Registered	5099 E. Blue Lupine Drive Wasilla AK 99554	CONSTRUCTION CRAFT LABORER
AK000125884	Yukon River Towing, LLC	Registered	P.O. Box 128 Emmonak AK 99581	CONSTRUCTION CRAFT LABORER
AK000000007	ALASKA TEAMSTER-EMPLOYER SERVICE TRAINING TRUST	Registered	520 East 34th Avenue, Suite 202 ANCHORAGE AK 99503	CONSTRUCTION DRIVER
AK000125887	Rock-n-Road Construction, Inc.	Registered	P.O. Box 1188 Petersburg AK 99833	CONSTRUCTION DRIVER
AK000125887	After Hours Truck & Fleet	Registered	988 Dreara Street Fairbanks AK 99709	DIESEL MECHANIC
AK000103514	Holland America Princess Alaska - Yukon	Registered	459 Ocean Dock Road Anchorage AK 99501	DIESEL MECHANIC
AK000126256	Peak Offroad Service Company - Bristol Bay Industrial	Registered	5015 Business Park Blvd., Suite 4000 Anchorage AK 99503	DIESEL MECHANIC
AK000125887	RL Trucking, LLC	Registered	1221 East 71st Avenue Anchorage AK 99518	DIESEL MECHANIC
AK000090003	ABC of Alaska, Inc	Registered	11134 June Agnes Circle Eagle River AK 99577	ELECTRICIAN
AK000125886	AC Electric, LLC	Registered	P.O. Box 1761 Seward AK 99654	ELECTRICIAN
AK000125886	Access Electric & General Trades, LLC	Registered	P.O. Box 670856 Chugiak AK 99567	ELECTRICIAN
AK000125886	Agape Electric	Registered	P.O. Box 7601 Nikiski AK 99635	ELECTRICIAN
AK000070015	ALASKA JOINT ELECTRICAL APPRENTICESHIP & TRAINING TRUST	Registered	5800 B ST ANCHORAGE AK 99518	ELECTRICIAN
AK000125886	Alaska Native Tribal Health Consortium, Division of Environmental Health & Engineering	Registered	4500 Diplomat Drive, Suite 454 Anchorage AK 99508	ELECTRICIAN
AK000125886	Alaska's Wiremen	Registered	5955 Fox Trail Road Seldovia AK 99669	ELECTRICIAN
AK000125243	Alps Electric	Registered	P.O. Box 385 Uplands AK 99685	ELECTRICIAN
AK000080238	Amrad Electric, Inc.	Registered	3400 International Street Fairbanks AK 99701	ELECTRICIAN
AK000040003	ANCHOR ELECTRIC	Registered	5362 COMMERCIAL DRIVE JUNEAU AK 99801	ELECTRICIAN
AK000125886	Anderson Brothers Electric, LLC	Registered	1630 Ocean View Drive Juneau AK 99801	ELECTRICIAN
AK000125886	Arctic Fox Electric, LLC	Registered	3251 Eastwind Court Anchorage AK 99516	ELECTRICIAN
AK000060013	AUNE BAY ELECTRIC	Registered	P.O. BOX 210194 AUKRE BAY AK 99821	ELECTRICIAN
AK000040025	BEAR ELECTRIC, INCORPORATED	Registered	208 Perkins Drive FAIRBANKS AK 99709	ELECTRICIAN
AK000125886	Bering Straits Development Company	Registered	P.O. Box 1008 Nome AK 99752	ELECTRICIAN
AK000125886	Boonoff Electric, LLC	Registered	P.O. Box 871301 Wasilla AK 99587	ELECTRICIAN
AK000104001	Burdwell, Incorporated	Registered	1425 Avion Street ANCHORAGE AK 99516	ELECTRICIAN
AK000080231	Burnell Electric, LLC	Registered	P.O. Box 66 Wrangell AK 99329	ELECTRICIAN
AK000125886	Caone Maintenance	Registered	1295 Adams Street North Pole AK 99705	ELECTRICIAN
AK000125886	Carbone Electric LLC	Registered	2236 Winding Birch Drive Chugiak AK 99567	ELECTRICIAN
AK000030009	CHANNEL ELECTRIC, INC.	Registered	135 COPPER RIDGE LANE KETCHIKAN AK 99901	ELECTRICIAN
AK000030008	CITY & BOROUGHT OF SITKA, ENVIRONMENTAL DEPT.	Registered	50 LINCOLN STREET SITKA AK 99585	ELECTRICIAN
AK000125886	CNS, Inc.	Registered	1695 Oronimi Drive Fairbanks AK 99709	ELECTRICIAN
AK000125886	Conline Building and Supply	Registered	1579 Wilmar Drive Eagle River AK 99577	ELECTRICIAN
AK000125886	Cooper Electric, LLC	Registered	1527 Wilmar Street, North Pole AK 99509	ELECTRICIAN
AK000125886	Facility Contractors, LLC	Registered	P.O. Box 1343 Kotzebue AK 99712	ELECTRICIAN
AK000125886	Frontier Electrical Services, LLC	Registered	P.O. Box 2020 Valdez AK 99686	ELECTRICIAN
AK000103504	Fuchs Electric, Incorporated	Registered	9400 Vanguard Drive, Suite A Anchorage AK 99507	ELECTRICIAN
AK000125886	G2 Construction, Inc.	Registered	P.O. Box 10690 Fairbanks AK 99701	ELECTRICIAN
AK000125886	Gleaser Electric	Registered	P.O. Box 113002 Anchorage AK 99511	ELECTRICIAN
AK000125886	GRS Controls	Registered	P.O. Box 54669 North Pole AK 99705	ELECTRICIAN
AK000091987	Hanson Construction, Incorporated	Registered	38050 Nevana Avenue Sterling AK 99872	ELECTRICIAN
AK000125886	Hicks Greens Creek Mining Company	Registered	P.O. Box 32199 Juneau AK 99801	ELECTRICIAN
AK000125886	Homestead Connection, Inc.	Registered	P.O. Box 439 Skagway AK 99840	ELECTRICIAN
AK000125886	Huffer Electric, Inc.	Registered	P.O. Box 2229 Seldovia AK 99669	ELECTRICIAN
AK000125886	ICE SERVICES, INCORPORATED	Registered	2606 C STREET, SUITE 2B ANCHORAGE AK 99503	ELECTRICIAN
AK0001091697	Icele Seafoods, Incorporated	Registered	411 N. Nordie Drive Petersburg AK 99833	ELECTRICIAN
AK000060009	INLET ELECTRICAL CONTRACTORS, LLC	Registered	P.O. BOX 20109 ANCHORAGE AK 99520	ELECTRICIAN
AK000125886	Integrated Communication Designs, Inc.	Registered	P.O. Box 11551 Anchorage AK 99511	ELECTRICIAN
AK000125889	Integrity Electric, Inc.	Registered	15955 Ryan Lane Soldotna AK 99669	ELECTRICIAN

ANCHORAGE SCHOOL DISTRICT'S
LIST OF

ALASKAN FEDERALLY REGISTERED APPRENTICESHIP PROGRAMS

Program Number	Program Name	Program Status	Address	Occupation Title
A000103402	Intelligent Design, LLC	Registered	11741 Timberlane Drive Anchorage AK 99515	ELECTRICIAN
A0001070022	HI ELECTRIC, INCORPORATED	Registered	P.O. BOX 3123 SOLDOTNA AK 99669	ELECTRICIAN
A0001060015	Satlow Holdings	Registered	2000 E. 80TH AVENUE ANCHORAGE AK 99507	ELECTRICIAN
A0001135729	KO Electric, LLC	Registered	P.O. Box 5556 Homer AK 99603	ELECTRICIAN
A0001125337	Laker Electric, Incorporated	Registered	11901 Industry Way Anchorage AK 99511	ELECTRICIAN
A0001157988	Luxwire Electric, LLC	Registered	1534 Town Way A Kenai AK 99611	ELECTRICIAN
A0001135718	Maddox Electric	Suspended	P.O. Box 2226 Seward AK 99664	ELECTRICIAN
2018-AK-70830	Mainline Electric	Registered	P.O. Box 927 Seward AK 99664	ELECTRICIAN
2019-AK-73163	Marathon Electric, LLC	Registered	P.O. Box 927 Seward AK 99664	ELECTRICIAN
A000147461	Mark IV Enterprises	Registered	951 E. Creekside Drive, #9 Wasilla AK 99654	ELECTRICIAN
A000070010	MAT-SU MECHANICAL, INC.	Registered	1265 EAST LOLLY CIRCLE WASILLA AK 99654	ELECTRICIAN
2019-AK-73045	MIDNIGHT SUN ELECTRIC	Registered	P.O. Box 788 Peirerburg AK 99833	ELECTRICIAN
A000990007	MIRANDA ELECTRIC, INCORPORATED	Registered	267 West Rockwell Avenue SOLDOTNA AK 99669	ELECTRICIAN
A0001060018	Monse Construction	Registered	P.O. Box 56031 North Pole AK 99705	ELECTRICIAN
A000145924	New Hope Apprenticeship Training	Registered	7362 West Parks Highway, #189 Wasilla AK 99623	ELECTRICIAN
2017-AK-69070	North Wire, LLC	Registered	806 S. Nordic Drive Petersburg AK 99833	ELECTRICIAN
A0001050016	Peak Offield Service Company - Bristol Bay Industrial	Registered	1130 E. Huffman Road, Suite 24, Box 6905 Anchorage AK 99515	ELECTRICIAN
2017-AK-69477	PITCHER ELECTRIC, INC.	Registered	5015 Business Park Blvd., Suite 4000 Anchorage AK 99503	ELECTRICIAN
A000060013	Power & Light, Incorporated	Registered	P.O. BOX 877871, WASILLA AK 99687	ELECTRICIAN
A0001125710	Premier Electric	Registered	7721 School Street, Suite 1, Anchorage AK 99518	ELECTRICIAN
A000113407	Prism Design & Construction	Registered	P.O. Box 674362 Wasilla AK 99687	ELECTRICIAN
A000119359	Puffin Electric, Inc.	Registered	P.O. Box 870162 Wasilla AK 99684	ELECTRICIAN
A000080232	Ray Electric, Inc.	Registered	3808 Ben Whalers Lane Homer AK 99603	ELECTRICIAN
2018-AK-70871	Renewable Energy Systems	Registered	1698 Airport Way Fairbanks AK 99701	ELECTRICIAN
A000140007	RISING SON ELECTRIC SERVICES, LLC	Registered	36784 Ekurna Lake Road Chugiak AK 99567	ELECTRICIAN
A000113405	Safe-T-Way Electric, Incorporated	Registered	6208 Mackay Street Anchorage AK 99518	ELECTRICIAN
2019-AK-72765	Salmon River Electric	Registered	P.O. Box 118 Gustavus AK 99826	ELECTRICIAN
A000050009	SITKA ELECTRIC COMPANY	Registered	1314 SAMMILL CREEK ROAD SITKA AK 99885	ELECTRICIAN
A0001108397	Sourdough Speedily Contractors	Registered	145 Shady Lane, #4 Soldotna AK 99669	ELECTRICIAN
A0001157697	Spectrum Services	Registered	35867 Driftwater Street Kenai AK 99611	ELECTRICIAN
2017-AK-69038	Stevens Electric	Registered	9650 Mukelball Circle Anchorage AK 99507	ELECTRICIAN
A000103005	Stevens Electrical	Registered	2741 Enleines Cutoff Road Juneau AK 99601	ELECTRICIAN
A000170008	SUMNER ELECTRICAL ENTERPRISE, LLC	Registered	6801 Hollywood Road Wasilla AK 99654	ELECTRICIAN
A000168009	TDX Power Services, LLC	Registered	815 East 82nd Avenue Suite 200 Anchorage AK 99518	ELECTRICIAN
A000101001	TEC PRO, LTD.	Registered	815 Whitney Road ANCHORAGE AK 99501	ELECTRICIAN
A000080228	Tesh Electric, LLC	Registered	1760 Abbott Road Anchorage AK 99507	ELECTRICIAN
A000109508	The Electrician, LLC	Registered	607 0th Steese Highway, Suite B, PMB 407 Fairbanks AK 99701	ELECTRICIAN
A000145917	Thomas and Sons Electric	Registered	P.O. Box 935 Craig AK 99921	ELECTRICIAN
A0001147688	Trident Seafoods Corporation	Registered	P.O. Box 228427 Anchorage AK 99522	ELECTRICIAN
A0001167706	TS Construction, Incorporated	Registered	23201 Cool Cddy Drive Fairbanks AK 99701	ELECTRICIAN
A000092469	Vanhey Electric	Registered	9107 W. Reliance Ind. Wasilla AK 99623	ELECTRICIAN
A000050017	WESTERN POWER ENGINEERING	Registered	P.O. BOX 320557 DUTCH HARBOR AK 99692	ELECTRICIAN
A0001060019	WESTWARD SEAFOODS, INCORPORATED	Registered	P.O. BOX 320608 DUTCH HARBOR AK 99692	ELECTRICIAN
A0001125265	Will Curtis	Registered	1495 Richardson Hwy Valdez AK 99686	ELECTRICIAN
A000030002	WOODGORTH ELECTRIC	Registered	2800 Daniels Circle Homer AK 99603	ELECTRICIAN
A000093009	YUKON-KODIAK WITH DELTA APPRENTICESHIP PROGRAM	Registered	P.O. BOX 963 BETHEL AK 99559	ELECTRICIAN
A000093002	ABC Electric	Registered	320 Divinity Street, Suite 2 Fairbanks AK 99701	ELECTRONIC SYSTEMS TECHNICIAN
A000093001	ABC Electric	Registered	320 Divinity Street, Suite 2 Fairbanks AK 99701	ELECTRONIC SYSTEMS TECHNICIAN
A000031003	TEC PRO, LTD.	Registered	815 Whitney Road Anchorage AK 99501	ELEVATOR CONSTRUCTOR MECHANIC
A000030004	INTERNATIONAL UNION OF ELEVATOR CONSTRUCTORS LOCAL 19 JAC	Registered	2364 15th Ave West Anchorage AK 99501	FLOOR LAYER
A000103005	GRAND PROSPECT CORPORATION	Registered	5821 Arctic Boulevard, Unit 8 ANCHORAGE AK 99518	FLOOR LAYER
A000040001	International Union of Painters and Allied Trades Local 1952 JATC	Registered	2017 Mill Barn Road Kodiak AK 99613	GLAZIER
A0001165318	The Great Alaskan Elevating, Inc.	Registered	301 Arctic Slope Avenue, Suite 100 ANCHORAGE AK 99518	GLAZIER
A0000930003	International Union of Painters and Allied Trades Local 1952 JATC	Registered	5821 Arctic Boulevard, Unit 8 ANCHORAGE AK 99518	HEATING & AIR-CONDITIONER INSTALL/SERVICER
A0000930003	ALASKA SCSE SHEET METAL WORKERS JATC	Registered	301 Arctic Slope Avenue, Suite 100 ANCHORAGE AK 99518	HEATING & AIR-CONDITIONER INSTALL/SERVICER
A0000490002	ANCHORAGE ALASKA AREA RIFE TRADES LOCAL #87 JATC	Registered	1637 WEST POTTER DRIVE ANCHORAGE AK 99518	HEATING & AIR-CONDITIONER INSTALL/SERVICER
A000070004	ALASKA OPERATING ENGINEERS/EMPLOYERS TRAINING TRUST	Registered	P.O. BOX 0889 PALMER AK 99645	HEAVY DUTY MECHANIC (Alternate Title: Heavy Construction Equipment Mechanics)
A0001930012	TECK ALASKA, INC.	Registered	3105 LAKESHORE BLD, BUILDING A, STE 301 ANCHORAGE AK 99503	INSULATION WORKER
A0000930003	ABC Electric	Registered	301 Arctic Slope Avenue, Suite 100 ANCHORAGE AK 99518	INSULATION WORKER
A000070001	AK HEAT & FROST INSULATORS & ALLIED WORKERS JATC	Registered	P.O. Box 20312 Anchorage AK 99520	INSULATION WORKER
A000010003	Alaska Commercial Insulation & Fireproofing, Inc.	Registered	2505 Barrow Street ANCHORAGE AK 99503	INSULATION WORKER
A0000520001	Alaska Commercial Training Trust	Registered	8751 King Street Anchorage AK 99515	LATHER (Alternate Title: Lathing Specialist)
A0000930003	ABC of Alaska, Inc.	Registered	301 Arctic Slope Avenue, Suite 100 ANCHORAGE AK 99518	LINE ERECTOR (POWER-LINE DISTRIBUTION ERECTOR)

ANCHORAGE SCHOOL DISTRICT'S
LIST OF

ALASKAN FEDERALLY REGISTERED APPRENTICESHIP PROGRAMS

Program Number	Program Name	Program Status	Address	Occupation Title
A100070015	ALASKA JOINT ELECTRICAL APPRENTICESHIP & TRAINING TRUST	Registered	5800 151 ANCHORAGE AK 99518	LINE MAINTAINER (Abernethy Title - Line Worker)
A100070016	ALASKA OPERATING ENGINEERS/EMPLOYERS TRAINING TRUST	Registered	P.O. Box 0989 PALMER AK 99645	LINE MAINTAINER (Abernethy Title - Line Worker)
A10001080980	Alaska Power & Telephone	Registered	P.O. Box 34105 Juneau AK 99803	LINE MAINTAINER (Abernethy Title - Line Worker)
A10001080980	Alaska Village Electric Cooperative, Inc.	Registered	4831 Eagle Street Anchorage AK 99503	LINE MAINTAINER (Abernethy Title - Line Worker)
A1000135305	CITY OF BOROUGHS OF SITKA - ELECTRICAL DEPARTMENT	Registered	105 JARVIS STREET SITKA AK 99835	LINE MAINTAINER (Abernethy Title - Line Worker)
A10001080978	CITY OF WRANGELL-WRANGELL MUNICIPAL LIGHT & POWER	Registered	P.O. Box 010 Unalakleet AK 99685	LINE MAINTAINER (Abernethy Title - Line Worker)
A10001080978	ICE SERVICES, INCORPORATED	Registered	1064 Cade Avenue WRANGELL AK 99259	LINE MAINTAINER (Abernethy Title - Line Worker)
A1000147462	North Slope Borough Power & Light	Registered	2605 C STREET, SUITE 208 ANCHORAGE AK 99503	LINE MAINTAINER (Abernethy Title - Line Worker)
A1000147462	Nushagak Electric & Telephone Cooperative, Inc.	Registered	P.O. Box 350 Dillingham AK 99576	LINE MAINTAINER (Abernethy Title - Line Worker)
A1000720004	ALASKA OPERATING ENGINEERS/EMPLOYERS TRAINING TRUST	Registered	P.O. Box 0989 PALMER AK 99645	LUBRICATION SERVICE MATERIAL DISPOSAL TECHNICIAN
A1000000006	ALASKA JOINT ELECTRICAL APPRENTICESHIP & TRAINING TRUST	Registered	5800 151 ANCHORAGE AK 99518	MAINTENANCE MECHANIC, TELEPHONE
A1000125889	ALASKA WORKS PARTNERSHIP, INC	Registered	1413 HYDER ST ANCHORAGE AK 99502	MAINTENANCE REPAIRER, BUILDING
A1000125889	Hiland Mountain Correctional Center	Registered	P.O. Box 877790 Wasilla AK 99587	MAINTENANCE REPAIRER, BUILDING
A10001900006	SPRING CREEK CORRECTIONAL CENTER	Registered	9101 Heisterberg Road Eagle River AK 99577	MAINTENANCE REPAIRER, BUILDING
A10001900010	Wildwood Correctional Center	Registered	P.O. BOX 2109 SEWARD AK 99664	MAINTENANCE REPAIRER, BUILDING
A10001910012	TECK ALASKA, INC.	Registered	BLDG 10, CHUGACH AVENUE KENAI AK 99611	MAINTENANCE REPAIRER, BUILDING
A1000520001	Alaska Carpenters Training Trust	Registered	3105 LAKESHORE DR., BUILDING A, STE 101 ANCHORAGE AK 99516	MECHANIC, INDUSTRIAL TRUCK
A1000520001	TECK ALASKA, INC.	Registered	8751 King Street Anchorage AK 99515	MILLWRIGHT
A1000590003	ABC of Alaska, Inc.	Registered	3105 LAKESHORE DR., BUILDING A, STE 101 ANCHORAGE AK 99516	OPERATING ENGINEER
A1000720004	ALASKA OPERATING ENGINEERS/EMPLOYERS TRAINING TRUST	Registered	P.O. Box 0989 PALMER AK 99645	OPERATING ENGINEER
A1000147461	Wolverine Supply, Inc.	Registered	5099 E. Blue Lagoon Drive Wasilla AK 99654	OPERATING ENGINEER
A100090003	ABC of Alaska, Inc.	Registered	301 Arctic Slope Avenue, Suite 100 ANCHORAGE AK 99518	PAINTER (Construction)
A1000490001	International Union of Painters and Allied Trades Local 1959 IATC	Registered	5821 Arctic Boulevard, Unit B ANCHORAGE AK 99518	PAINTER (Construction)
A100090003	ABC of Alaska, Inc.	Registered	301 Arctic Slope Avenue, Suite 100 ANCHORAGE AK 99518	PIPE FITTER (Construction)
A1000490002	ANCHORAGE ALASKA AREA PIPE TRADES LOCAL #367 IATC	Registered	617 WEST POTTER DRIVE ANCHORAGE AK 99518	PIPE FITTER (Construction)
A10001510002	Fairbanks Area Plumbers & Pipefitters IATC	Registered	1978 BURGESS AVENUE FAIRBANKS AK 99709	PIPE FITTER (Construction)
A1000660001	JUNEAU PLUMBERS IATC	Registered	1751 ANNA STREET JUNEAU AK 99801	PIPE FITTER (Construction)
A1000700017	Alaska Towel Trades IATC	Registered	825 East 8th Avenue, Suite 10 Anchorage AK 99501	PLASTERER
A10001080977	907 Heating and Plumbing	Registered	P.O. Box 220032 Anchorage AK 99522	PLUMBER
A1000125246	Ace Heating, Inc.	Registered	2780 N. Heathway Circle Wasilla AK 99654	PLUMBER
A10001080977	Al Fish Plumbing, LLC	Registered	11805 Gregory Road Anchorage AK 99516	PLUMBER
A1000125886	Alaska Clearwater Mechanical, LLC	Registered	P.O. Box 709 Willow AK 99688	PLUMBER
A1000113542	Alaska Native Tribal Health Consortium, Division of Environmental Health & Engineering	Registered	4500 Diplomacy Drive, Suite 454 Anchorage AK 99508	PLUMBER
A10001080977	ALASKA PLUMBING & HEATING	Registered	P.O. Box 210240 Auke Bay AK 99821	PLUMBER
A10001080977	All American Plumbing & Heating	Registered	9509 Antler Way Juneau AK 99801	PLUMBER
A1000135098	All-Star Plumbing & Heating, LLC	Registered	11320 Bearpaw Street Anchorage AK 99516	PLUMBER
A1000157999	ALWAYS ON CALL MOUNTAIN MECHANICAL CORPORATION	Registered	6633 Brayton Drive Anchorage AK 99507	PLUMBER
A1000490002	ANCHORAGE ALASKA AREA PIPE TRADES LOCAL #367 IATC	Registered	8427 MENTHA STREET ANCHORAGE AK 99518	PLUMBER
A100070016	ANCHORAGE PLUMBING & HEATING SERVICES, LLC	Registered	617 WEST POTTER DRIVE ANCHORAGE AK 99518	PLUMBER
A1000500015	APPE PLUMBING & HEATING SERVICES, LLC	Registered	7600 King Street ANCHORAGE AK 99518	PLUMBER
A1000681112	Arctic Chain Plumbing & Heating, Inc.	Registered	13087 E. Jessica Ann Street Seward AK 99674	PLUMBER
2019-AK-6854	Arctic Plumbing & Heating, LLC	Registered	1200 East 76th Avenue, Unit 1120 Anchorage AK 99518	PLUMBER
2019-AK-72500	Bredley Mechanical Company	Registered	2215 Richardson Highway, Suite #2 North Pole AK 99705	PLUMBER
A1000146522	Blades Mechanical	Registered	148 Hillcrest Avenue, #2 Subotina AK 99669	PLUMBER
A1000146522	Bolman Plumbing & Heating, Inc.	Registered	1900 Unalome Drive Palmer AK 99645	PLUMBER
A1000146522	BOYMAN MECHANICAL CONTRACTORS, INC	Registered	1317 1st Drive Anchorage AK 99515	PLUMBER
A1000135713	Circle Plumber, Incorporated	Registered	3117 S. Sibley Street Anchorage AK 99503	PLUMBER
A10009002437	Circle Plumber, Incorporated	Suspended	3317 S. Sibley Street Anchorage AK 99503	PLUMBER
A1000135717	D.H. Plumbing & Heating, Incorporated	Registered	7741 Long Street Anchorage AK 99518	PLUMBER
A10001467600	Dawson Construction, Incorporated	Registered	6425 PITTMANN AVE Homer AK 99603	PLUMBER
A10001467600	DRVAL MECHANICAL, INC	Registered	4220 Carling Drive West Kenai AK 99601	PLUMBER
A10001467602	Erns Plumbing & Heating, LLC	Registered	955 BILEY COURT FAIRBANKS AK 99701	PLUMBER
A10001080955	Erns Plumbing & Heating, LLC	Registered	P.O. Box 233664 Anchorage AK 99523	PLUMBER
A10001040029	ENCORE MECHANICAL, INC.	Registered	1308 Lakeshore Drive Homer AK 99603	PLUMBER
A10001135716	Extreme Heating & Air, Incorporated	Registered	16805 Farm Avenue Eagle River AK 99577	PLUMBER
A10001510002	Fairbanks Area Plumbers & Pipefitters IATC	Registered	1578 BURGESS AVENUE FAIRBANKS AK 99709	PLUMBER
A10001465206	Fedor's Plumbing & Heating, LLC	Registered	5502 Cordova Street Anchorage AK 99518	PLUMBER
A1000125882	Funk Services	Registered	P.O. Box 672188 Chugiak AK 99567	PLUMBER
A10001355912	Glacier Point Services	Registered	P.O. Box 61237 Fairbanks AK 99706	PLUMBER
A10001355912	H and M Plumbing & Heating, Inc.	Registered	P.O. Box 222225 Anchorage AK 99522	PLUMBER
A1000040027	HARDROCK PLUMBING AND HEATING, LLC	Registered	4740 E. FATTIC DRIVE WASILLA AK 99654	PLUMBER
A10001050004	HEATCO, LLC	Registered	17141 N. EAGLE RIVER LOOP ROAD EAGLE RIVER AK 99577	PLUMBER
2019-AK-72458	Homer Plumbing and Heating	Registered	581 Mountain View Drive Homer AK 99603	PLUMBER

ANCHORAGE SCHOOL DISTRICT'S
LIST OF

ALASKAN FEDERALLY REGISTERED APPRENTICESHIP PROGRAMS

Program Number	Program Name	Program Status	Address	Occupation Title
A1000158005	Hunter Mechanical International Corporation	Registered	1377 East 4th Avenue, Suite 1 Anchorage AK 99501	PLUMBER
A10001070010	ICE SERVICES, INCORPORATED	Registered	2406 C STREET, SUITE 28 ANCHORAGE AK 99503	PLUMBER
A1000168010	Icy Strait Plumbing and Heating	Registered	8292a Gamel Street Juneau AK 99801	PLUMBER
A10001108402	Intelligent Design, LLC	Registered	11741 Timberlane Drive Anchorage AK 99515	PLUMBER
2018-AK-72080	IGLA Enterprises dba Runstrom Plumbing & Heating	Registered	HC 89 Box 8182, Talkeena AK 99676	PLUMBER
A10001081636	IGH Plumbing & Heating, Incorporated	Registered	P.O. Box 3385 Palmer AK 99645	PLUMBER
2018-AK-65772	John White's Plumbing & Heating	Registered	5327 Kenai Spur Highway Kenai AK 99611	PLUMBER
A10000592650	John's Heating Service, Inc.	Registered	1311 Mill Bay Road Kodiak AK 99615	PLUMBER
A1000060005	JUNNETMAN PLUMBING & HEATING, INC.	Registered	51315 SEA QUEST DRIVE NEVAI AK 99611	PLUMBER
2017-AK-69607	JUNEAU PLUMBERS IATC	Registered	1751 AKA STREET JUNEAU AK 99801	PLUMBER
A1000157698	Kiwi Mechanical	Registered	26547 S. Cobble Loop Kodiak AK 99610	PLUMBER
A10001500012	KNIP PLUMBING & HEATING	Registered	Box 2132, Cordova AK 99574	PLUMBER
A10000600017	LARRY'S PLUMBING & HEATING	Registered	4915 W. 94TH AVENUE ANCHORAGE AK 99502	PLUMBER
A10001147687	Larry's Quality Heating & Plumbing, Inc.	Registered	P.O. BOX 4148 KODIAK AK 99601	PLUMBER
A1000080234	Lewis Mechanical, Inc.	Registered	2531 Barrett Avenue Juneau AK 99801	PLUMBER
A10000900011	M&J PLUMBING & HEATING, INC.	Registered	13240 View Heights Way Anchorage AK 99516	PLUMBER
A1000070010	MAT-SU MECHANICAL, INC.	Registered	34360 Business Park Frontage Road SOLDOTNA AK 99669	PLUMBER
2017-AK-61689	Monkey Wrench Mechanical	Registered	1265 EAST LILLY CIRCLE WASILLA AK 99654	PLUMBER
A1000113541	Moore Heating & Air Conditioning	Registered	P.O. Box 73441 Fairbanks AK 99707	PLUMBER
A1000114890	Mr. Roster Plumbing of Fairbanks	Registered	1801 East Dowling Road Anchorage AK 99507	PLUMBER
A10001091696	North Country Stoves, Incorporated	Registered	875 Old Richardson Highway FAIRBANKS AK 99701	PLUMBER
A1000146528	Pacific Elm Mechanical, LLC	Registered	2207 E. Tudor Road, #40 Anchorage AK 99507	PLUMBER
A10001070004	PARAGON PLUMBING & HEATING, INCORPORATED	Registered	P.O. Box 659 Haines AK 99827	PLUMBER
A1000000005	PARHURST MECHANICAL	Registered	3400 MACARTHUR STREET FAIRBANKS AK 99701	PLUMBER
A10001050006	PLEASANTS PLUMBING & HEATING	Registered	P.O. BOX 1806 Palmer AK 99645	PLUMBER
A10001060010	Pollard Construction	Suspended	8301 SCHOON STREET ANCHORAGE AK 99518	PLUMBER
A10001167795	Portwide Plumbing and Heating, Inc.	Registered	P.O. BOX 32811 Juneau AK 99803	PLUMBER
A1000092200	Premier Mechanical, LLC	Registered	1500 Alaska Way Fairbanks AK 99709	PLUMBER
A10001108394	Red Hot Mechanical, Incorporated	Registered	2011 Millbay Road, #2 Kodiak AK 99615	PLUMBER
A10001146735	River City Plumbing & Heating	Registered	11723 OH Green Highway, Suite 107 Eagle River AK 99577	PLUMBER
A10001177907	Rock Solid Plumbing & Heating	Registered	865 6th Avenue Fairbanks AK 99701	PLUMBER
2017-AK-652	S.E. Plumbing, Incorporated	Registered	P.O. Box 674418 Wasilla AK 99687	PLUMBER
A1000168008	Scott's Plumbing	Registered	86 Gairland Court Ketchikan AK 99901	PLUMBER
A1000098257	Scott's Heating & Plumbing Services, Inc.	Registered	P.O. Box 3132 Kodiak AK 99615	PLUMBER
A10001040017	STATEWIDE MECHANICAL, LLC	Registered	22750 MC MANUS DRIVE CHUGIAK AK 99567	PLUMBER
A10000983122	Sundance Construction Company, Inc.	Registered	P.O. Box 561 Kaslo AK 99610	PLUMBER
A1000092651	Superior Mechanical, Inc.	Registered	P.O. Box 62409 Fairbanks AK 99708	PLUMBER
2018-AK-71943	Tauman Mechanical Plumbing & Heating, LLC	Registered	730 W. 88th Avenue Anchorage AK 99515	PLUMBER
A10001070001	VALLEY MECHANICAL CONTRACTING, INCORPORATED	Registered	8673 TEXAL DRIVE WASILLA AK 99654	PLUMBER
A1000115707	Waterworks Plumbing & Heating	Registered	P.O. Box 1974 Seldovia AK 99669	PLUMBER
2019-AK-67310	Wolf Pack Mechanical, LLC	Registered	P.O. Box 521118 Big Lake AK 99662	PLUMBER
A1000030009	YUKON-KUSKOKWIM DELTA APPRENTICESHIP PROGRAM	Registered	P.O. BOX 969 BETHEL AK 99559	PLUMBER
A1000092654	Ketchikan Indian Community	Registered	915 Steffman Street Ketchikan AK 99901	RESIDENTIAL CARPENTER
A1000115357	Nichols Construction, LLC	Registered	P.O. Box 339 Wadai Cove AK 99401	RESIDENTIAL CARPENTER
A1000135904	Niuron River Rowing, LLC	Registered	P.O. Box 228 Emmonak AK 99646	RESIDENTIAL CARPENTER
A10000350004	A & E ELECTRIC	Registered	1243 CROSSON AVENUE FAIRBANKS AK 99701	RESIDENTIAL WIREMAN
2008-07-0025	ALASKA JOINT ELECTRICAL APPRENTICESHIP & TRAINING TRUST	Registered	8609 B ST ANCHORAGE AK 99518	RESIDENTIAL WIREMAN
A1000115672	Big W Electric, LLC	Registered	P.O. Box 80001 Juneau AK 99801	RESIDENTIAL WIREMAN
A10001108153	Big W Heating Services	Registered	P.O. Box 1857 Fairbanks AK 99708	RESIDENTIAL WIREMAN
A10001359007	Big W Heating Services	Registered	P.O. Box 1857 Fairbanks AK 99708	RESIDENTIAL WIREMAN
A10001108151	Big W Heating Services	Registered	P.O. Box 1857 Fairbanks AK 99708	RESIDENTIAL WIREMAN
A10001145713	Garther Electric Company, LLC	Registered	1415 North Hillman Court Wasilla AK 99654	RESIDENTIAL WIREMAN
A10000400014	INTERIOR REGIONAL HOUSING AUTHORITY	Registered	4193 Kenai Avenue Juneau AK 99801	RESIDENTIAL WIREMAN
A10001476129	Marty Wicks Electrical	Registered	820 27TH AVENUE FAIRBANKS AK 99701	RESIDENTIAL WIREMAN
2017-AK-65679	New Hope Apprenticeship Training	Registered	1654 Sterling Highway Homer AK 99603	RESIDENTIAL WIREMAN
A10001060007	Pacific North Construction	Registered	2421 West Trailer Drive Wasilla AK 99654	RESIDENTIAL WIREMAN
A10000900013	PITCHER ELECTRIC, INC.	Registered	P.O. BOX 97265 Wasilla AK 99687	RESIDENTIAL WIREMAN
A10001108400	RISING SON ELECTRIC SERVICES, LLC	Registered	P.O. BOX 87761 WASILLA AK 99687	RESIDENTIAL WIREMAN
A1000050001	Solid Ground Electric	Registered	36784 Elmora Lake Road Chugiak AK 99567	RESIDENTIAL WIREMAN
A1000050001	Alaska Concrete Training Trust	Registered	13811 Savage Drive Eagle River AK 99577	SCAFFOLD ERECTOR
A10000900003	ABC of Alaska, Inc.	Registered	8751 10th Street Anchorage AK 99515	SHEET METAL WORKER
A10000500001	ALASKA SCSE SHEET METAL WORKERS IATC	Registered	301 Arctic Spur Avenue, Suite 100 ANCHORAGE AK 99518	SHEET METAL WORKER
A10001870004	DENALI MECHANICAL, INC.	Registered	1307 E. 75TH AVENUE, #4 ANCHORAGE AK 99518	SHEET METAL WORKER
A1000150001	FAIRBANKS AREA SHEET METAL WORKERS IATC	Registered	955 RILEY COURT FAIRBANKS AK 99701	SHEET METAL WORKER
A10001080587	Valley Mechanical Contractors, Inc.	Registered	1260 ALUMORA DRIVE FAIRBANKS AK 99709	SHEET METAL WORKER

ANCHORAGE SCHOOL DISTRICTS'
 LIST OF

ALASKAN FEDERALLY REGISTERED APPRENTICESHIP PROGRAMS

Program Number	Program Name	Program Status	Address	Occupation Title
A1000950003	ABC of Alaska, Inc.	Registered	301 Arctic Slope Avenue, Suite 100 ANCHORAGE AK 99518	SPRINKLER FITTER (Existing Title: Pipe Fitter)
A10009490002	ANCHORAGE ALASKA AREA PIPE TRADES LOCAL #867 IATC	Registered	617 WEST POTTER DRIVE ANCHORAGE AK 99518	SPRINKLER FITTER (Existing Title: Pipe Fitter)
A10011510002	Fairbanks Area Plumbers & Pipefitters IATC	Registered	1578 BURGESS AVENUE FAIRBANKS AK 99709	SPRINKLER FITTER (Existing Title: Pipe Fitter)
A10000780016	ALASKA IRONWORKERS IATC	Registered	8441 SCHOON STREET ANCHORAGE AK 99518	STRUCTURAL STEEL WORKER (Alternative Title: Ironworker or Structural Ironworker)
A10009000007	ALASKA TEAMSTER-EMPLOYER SERVICE TRAINING TRUST	Registered	520 East 34th Avenue, Suite 201 ANCHORAGE AK 99503	SURVEYOR ASSISTANT INSTRUMENT
A10009400001	ALASKA JOINT ELECTRICAL APPRENTICESHIP & TRAINING TRUST	Registered	5800 E. STREET ANCHORAGE AK 99518	TREE TRIMMER (Line Clearance)
A10009000007	ALASKA TEAMSTER-EMPLOYER SERVICE TRAINING TRUST	Registered	520 East 34th Avenue, Suite 201 ANCHORAGE AK 99503	TRUCK DRIVER, HEAVY
2017-NH-688.0	River Valley Workforce Institute, Inc.	Registered	325 Mount Support Road Lebanon NH 03766	WELDER, COMBINATION
A10001910002	TECK ALASKA, INC.	Registered	3105 AKESHORE DR., BUILDING A, STE. 201 ANCHORAGE AK 99518	WELDER, COMBINATION

Multiple-employer apprenticeship sponsors.

**ANCHORAGE SCHOOL DISTRICT
APPRENTICE UTILIZATION FORM**

Project Name: _____

Solicitation Number: _____

Contractor: _____

Prime Contractors

1. Please list crafts/trades that will be used to complete this project and have Alaskan Federally Registered Apprenticeship programs.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

2. Please list the apprentices and corresponding apprenticeship programs that will be used by the prime contractor to complete this project. If more space is needed, please attach supplemental sheets.

APPRENTICE'S NAME	APPRENTICESHIP PROGRAM
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

3. Please list the subcontractors that will be used on the project.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

4. Please list the apprentices and corresponding apprenticeship programs that will be used by the subcontractors to complete this project. If more space is needed, please attach supplemental sheets.

APPRENTICE'S NAME	APPRENTICESHIP PROGRAM
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

PENALTY TABLE

\$100,001 TO \$500,000

1ST NON-COMPLIANCE (30-DAY)	\$ 500.00	
2ND CONSECUTIVE NON-COMPLIANCE (30-DAY)	\$ 750.00	
3RD 30-DAY CONSECUTIVE NON-COMPLIANCE	\$ 1,000.00	
4TH CONSECUTIVE NON-COMPLIANCE (30-DAY)	\$ 1,000.00	AND FINDING OF NON-RESPONSIBILITY IN FUTURE BIDDING
FURTHER CONSECUTIVE NON-COMPLIANCE EXCEEDING 4TH NON-COMPLIANCE (30-DAY)	\$ 1,000.00	AND FINDING OF NON-RESPONSIBILITY IN FUTURE BIDDING

\$500,001 TO \$1,000,000

1ST NON-COMPLIANCE (30-DAY)	\$ 750.00	
2ND CONSECUTIVE NON-COMPLIANCE (30-DAY)	\$ 1,500.00	
3RD CONSECUTIVE NON-COMPLIANCE (30-DAY)	\$ 2,500.00	
4TH CONSECUTIVE NON-COMPLIANCE (30-DAY)	\$ 5,000.00	AND FINDING OF NON-RESPONSIBILITY IN FUTURE BIDDING
FURTHER CONSECUTIVE NON-COMPLIANCE EXCEEDING 4TH NON-COMPLIANCE (30-DAY)	\$ 5,000.00	AND FINDING OF NON-RESPONSIBILITY IN FUTURE BIDDING

\$1,000,001 TO \$3,000,000

1ST NON-COMPLIANCE (30-DAY)	\$ 1,000.00	
2ND CONSECUTIVE NON-COMPLIANCE (30-DAY)	\$ 2,500.00	
3RD CONSECUTIVE NON-COMPLIANCE (30-DAY)	\$ 5,000.00	
4TH CONSECUTIVE NON-COMPLIANCE (30-DAY)	\$ 7,500.00	AND FINDING OF NON-RESPONSIBILITY IN FUTURE BIDDING
FURTHER CONSECUTIVE NON-COMPLIANCE EXCEEDING 4TH NON-COMPLIANCE (30-DAY)	\$ 7,500.00	AND FINDING OF NON-RESPONSIBILITY IN FUTURE BIDDING

\$3,000,001 TO \$5,000,000

1ST NON-COMPLIANCE (30-DAY)	\$ 1,500.00	
2ND CONSECUTIVE NON-COMPLIANCE (30-DAY)	\$ 3,000.00	
3RD CONSECUTIVE NON-COMPLIANCE (30-DAY)	\$ 7,500.00	
4TH CONSECUTIVE NON-COMPLIANCE (30-DAY)	\$ 10,000.00	AND FINDING OF NON-RESPONSIBILITY IN FUTURE BIDDING
FURTHER CONSECUTIVE NON-COMPLIANCE EXCEEDING 4TH NON-COMPLIANCE (30-DAY)	\$ 10,000.00	AND FINDING OF NON-RESPONSIBILITY IN FUTURE BIDDING

OVER \$5,000,000

1ST NON-COMPLIANCE (90-DAY)	\$ 2,500.00	
2ND CONSECUTIVE NON-COMPLIANCE (90-DAY)	\$ 5,000.00	
3RD CONSECUTIVE NON-COMPLIANCE (90-DAY)	\$ 8,000.00	
4TH CONSECUTIVE NON-COMPLIANCE (90-DAY)	\$ 10,000.00	AND FINDING OF NON-RESPONSIBILITY IN FUTURE BIDDING
FURTHER CONSECUTIVE NON-COMPLIANCE EXCEEDING 4TH NON-COMPLIANCE (90-DAY)	\$ 10,000.00	AND FINDING OF NON-RESPONSIBILITY IN FUTURE BIDDING

END OF SECTION

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

REFERENCE:

The General Conditions shall be GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, ANCHORAGE SCHOOL DISTRICT, ANCHORAGE, ALASKA, bound herein.

SUPPLEMENTS:

Supplements may modify, change, delete, or add to these General Conditions. Where any article of the General Conditions is modified or any paragraph deleted, or any subparagraph or clause thereof is modified, or deleted by supplements, the unaltered provisions of such article, paragraph, subparagraph or clause shall remain in effect. The General Conditions and the Supplementary General Conditions are applicable to all of the Work under this Contract and shall apply to the Contractor and all Subcontractors, Sub-subcontractors, and Material Suppliers and Vendors.

TABLE OF ARTICLES

ARTICLE	PAGE
1. THE CONTRACT DOCUMENTS	00700-3
2. ARCHITECT	00700-7
3. OWNER	00700-10
4. CONTRACTOR	00700-14
5. SUBCONTRACTORS	00700-25
6. WORK BY OWNER OR BY SEPARATE CONTRACTORS	00700-28
7. MISCELLANEOUS PROVISIONS.....	00700-30
8. TIME	00700-34
9. PAYMENTS AND COMPLETION	00700-38
10. PROTECTION OF PERSONS AND PROPERTY.....	00700-46
11. INSURANCE.....	00700-48
12. CHANGES IN THE WORK.....	00700-52
13. UNCOVERING AND CORRECTION OF THE WORK.....	00700-60
14. TERMINATION OF THE CONTRACT.....	00700-62

ARTICLE 1

CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.1 The following terms as used in this Contract are defined as follows:

"Architect / Engineer or A/E": The design consultant of the Owner.

"Construction Manager": Supervises the construction phase of construction projects for the Anchorage School District Facilities Department.

"Contract": The Agreement between Owner and Contractor and the referenced Contract Documents stated therein.

"Contractor": The person, firm, or corporation contractually responsible to the Owner to provide the services called for by this Contract. Such entity may also be referred to as Managing General Contractor, General Contractor, or Prime Contractor.

"Days": Calendar days unless otherwise noted.

"Direct Cost": A direct cost is any cost that can be identified specifically with a particular final cost objective, i.e., with this contract, or an item of extra work, or change order under the contract.

"Senior Director of Capital Planning & Construction": Manages the Operations of the Anchorage School District Capital Planning & Construction Department.

"Furnish": Supply and deliver to the project including the cost to supply and deliver.

"Indirect Cost": An indirect cost, collectively called overhead, is any cost not directly identified with a single, final cost objective, but identified with two or more final cost objectives or an intermediate cost objective.

"Install": Build into the Work, ready to use in a complete, finished, and operable system, including the cost to install.

"Owner": The Anchorage School District, its Anchorage School Board of Education, the Superintendent of the Anchorage School District, and its employees.

"Project Manager": The person designated by the Senior Director of Capital Planning & Construction as the Owner's representative for this Contract, responsible for the day-to-day coordination between the Owner and the Contractor.

"Provide": Furnish and install for a complete, finished, and operable system.

"Reasonable Cost": A cost is reasonable if, in its nature or amount, it does not exceed that which would be incurred in a competitive market.

"Shop Drawings, Setting Drawings, Manufacturer's Printed Information and Submittal (collectively known as "Submittals")": The Contractor's information consisting of drawings, catalogs, illustrations, calculations, and other data delivered to the Owner for the purpose of assuring the Owner, prior to execution of that part of the Work, that the prescriptive element, component, subsystem, or service to be provided generally conforms with the

Contract. The Contractor is responsible to the Owner for the accuracy and completeness of the Submittals.

"Subcontractor": A person, firm, or entity who has a direct contract with the Contractor to perform any of the work.

"Work" or "Project": The finished product required by the Contract Documents together with the means and methods as determined, by the Contractor, to achieve the finished product.

1.1.2 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Owner-Contractor Agreement, the Drawings, the Project Manual, and all Addenda issued prior to and all Modifications issued after execution of the Contract. A Modification is (1) a directive for change in the work pursuant to Section 12.1.2 or (2) a change order pursuant to Section 12.2.6.

1.1.3 THE CONTRACT

The Contract is the sum of all the Contract Documents. This Contract represents the entire and integrated agreement between the Owner and the Contractor and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.2.

1.1.4 THE WORK

The Work comprises the completed construction required by the Contract Documents and includes all labor necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.

1.1.5 THE PROJECT

The Project is the total construction, of which the Work performed under the Contract documents may be the whole or a part.

1.1.6 SCHOOL BOARD

Board of Education of the Anchorage School District, Anchorage, Alaska.

1.1.7 BIDDER

Any individual, firm, partnership, corporation or combination thereof, formally submitting a bid for the work contemplated, or any portion thereof, acting directly or through an authorized representative.

1.1.8 MUNICIPALITY

Municipality of Anchorage, Alaska.

1.1.9 PROPOSAL

1.1.9.1 BID PROPOSAL

The written proposal of the Bidder on the form furnished by the Owner for the Work contemplated, and which is required to be signed by the Bidder.

1.1.9.2 REQUEST FOR PROPOSAL (RFP)

The offer of the Contractor submitted on the prescribed form from the Project Manager to perform the work and furnish labor, material and all other costs at the prices quoted by the Contractor for proposed changes in the work.

1.1. 10 SPECIFICATIONS

The products, directions, requirements, explanations, terms and provisions pertaining to the various features of the Work to be done and the manner and method of performance. The specifications include such directions, requirements and explanations as appear on the drawings and as may otherwise be defined.

1.1. 11 PROJECT SITE

The geographic location of the Project as indicated on the Drawings.

1.1. 12 PROJECT MANUAL

The Project Manual includes the Bidding and Contract Requirements, Project Schedule Milestone Dates, General and Supplementary Conditions, Wage Rates, the Specifications and project drawings incorporated by reference.

1.1. 13 REQUEST FOR INFORMATION

Request for Information. Written interpretations necessary for the proper execution or progress of the Work, in the form of drawings or otherwise, will be issued with reasonable promptness by the Project Manager. The Contractor may make written request to the Project Manager for such interpretations. Such interpretations will be consistent with and reasonably inferable from the Contract Documents.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 The Contract shall be signed in doubles by the Owner and Contractor, each of which shall be deemed an original, but all or which shall constitute one and the same instrument.

1.2.2 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. Except as otherwise specifically provided, the Contractor shall furnish all labor, tools, implements, machinery, supplies, materials, and incidentals, and shall do all things necessary to perform and to complete the Work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonable inferable therefrom as being necessary to produce the intended results. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings unless otherwise specifically defined herein.

1.2.4 The organization of the Specifications into division, sections and articles, and the arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by a trade.

1.2.5 If any portion of the Contract Documents shall be in conflict with any other portion, the

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

various documents comprising the Contract Documents shall govern in the following order of precedence:

- 1.2.5.1 The Owner-Contractor Agreement;
- 1.2.5.2 Modifications;
- 1.2.5.3 Addenda;
- 1.2.5.4 Section 00800 - Supplementary General Conditions;
- 1.2.5.5 Section 00700 - General Conditions of the Contract for Construction;
- 1.2.5.6 Specifications - embodying all other sections in the Project Manual;
- 1.2.5.7 Drawings: as between schedules and information given on Drawings, the schedules shall govern; as between written dimensions given on Drawings and scaled measurements, the written dimensions shall govern; as between large-scale Drawings and small-scale Drawings, the larger scale shall govern;
- 1.2.5.8 Performance Bond, Labor and Material Payment Bond;
- 1.2.5.9 Bid/Proposal Form;
- 1.2.5.10 Instructions to Bidders/Proposers;
- 1.2.5.11 Invitation to Bid/Request for Proposal;

All such conflicts shall be reported, in writing, to the Project Manager. Schedules, lists, indexes, tables, inventories, written instruction, written descriptions, summaries, statements, classifications, specifications, written selections, or written designations, although appearing on the Drawings, are deemed to be and are "Specifications" as defined by this Subparagraph 1.2.5. The principles as set forth herein shall not alter the provisions of Subparagraph 1.2.3.

In the event there is a conflict between or among any provisions within one of the component parts of the Contract Documents, the higher standard or more stringent requirement shall govern.

- 1.2.6 The Contractor agrees that nothing contained in the Contract Documents or any contract between the Owner and the Architect shall create any contractual relationship between the Architect and the Contractor, any Subcontractors, Sub-subcontractors, Material Suppliers or Vendors. The Contractor acknowledges and agrees that this Contract is not intended to create, nor shall any provision be interpreted as creating, any contractual relationship between the Owner or Contractor or any third parties.
- 1.2.7 Any material or operation specified by reference to published specifications of a manufacturer, a society, an association, a code, or other published standard, shall comply with requirements of the listed document and project specifications; or as between referenced documents, the more stringent code or performance requirements shall govern. The Contractor, if requested, shall furnish an affidavit from the manufacturer certifying that the materials or products delivered to the Project meet the requirement specified.

1.3 OWNERSHIP AND USE OF DOCUMENTS

- 1.3.1 All Drawings, Specifications and copies thereof furnished by the Owner are and shall remain its property. They are to be used only with respect to this Project and are not to be used on any other project.
- 1.3.2 The Owner will provide conformed drawings and specifications incorporating Addenda items into the Contract Documents. A reasonable number of reproduced sets will be provided to the contractor without charge.

END OF ARTICLE 1

ARTICLE 2

ARCHITECT

2.1 DEFINITION

- 2.1.1 The Architect is the person or organization lawfully licensed to practice architecture, or an entity lawfully practicing architecture identified as such in the Owner-Contractor Agreement, and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Architect means the Architect and his engineers, whether under contract or within his own organization, or his authorized representative.
- 2.1.2 The term Architect is interchangeable with the term Project Architect, and is exclusive of the services of the Asbestos Abatement Architect.
- 2.1.3 The Asbestos Abatement Architect is not a part of the Architect's organization.

2.2 SERVICES OF THE ARCHITECT

- 2.2.1 The Architect will provide certain services as hereinafter described.
- 2.2.2 Should errors, omissions, or conflicts in the Drawings, Specifications, or other Contract Documents provided by the Architect be discovered, the Architect will prepare such amendments or supplementary documents and provide consultation as may be required.
- 2.2.3 The Architect and his consulting engineers (including but not limited to the structural, mechanical, and electrical disciplines) will visit the site at intervals appropriate to the stage of construction to familiarize themselves generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. Unless otherwise provided in the Owner-Architect Agreement, the Architect and his consulting engineers will not be required to make exhaustive or continuous on-site inspection or observations to check the quality or quantity of the Work, but they shall make as many on-site inspections and observations as may reasonably be required to fulfill their obligations to the Owner. On the basis of such on-site observation, the Architect and his consulting engineers shall endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor.
- 2.2.4 The Architect will render written field reports to the Project Manager in the form required by the Project Manager relating to the periodic visits and inspections of the Project required by Subparagraph 2.2.3.
- 2.2.5 The Architect will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and he will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Architect will not be responsible for or have control or charge over the acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any of the work.
- 2.2.6 The Architect shall at all times have access to the Work wherever it is in preparation or progress. The Contractor shall provide safe facilities for such access so the Architect may perform his functions under the Contract Documents.
- 2.2.7 The Project Manager will consult with the Architect regarding the Contractor's Applications for Payment and both shall sign the Applications for Payment as provided in Subparagraph

9.4.

- 2.2.8 As required, the Architect will render to the Project Manager interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and in accordance with any time limit agreed upon.
- 2.2.9 All communications, correspondence, submittals, and documents exchanged between the Architect and the Contractor in connection with the Project shall be through or in the manner prescribed by the Project Manager.
- 2.2.10 All interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents.
- 2.2.11 The Architect's decision in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents and approved by the Project Manager.
- 2.2.12 If the Architect observes any Work that does not conform to the Contract Documents, the Architect shall promptly report in writing this observation to the Project Manager. The Architect will prepare and submit to the Project Manager punchlists of the Contractor's Work which is not in conformance with the Contract Documents. The Project Manager will transmit such punchlists to the Contractor.
- 2.2.13 The Architect will review and take appropriate action upon Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for conformance with the design concept of the Work and for general compliance with the Contract Documents. Such action shall be taken in no more than twenty-one (21) days of receipt unless otherwise authorized by the Project Manager.
- 2.2.14 The Project Manager will establish with the Architect procedures to be followed for review and processing of all Shop Drawings, catalog submittals, project reports, test reports, maintenance manuals, and other necessary documentation, as well as requests for changes and applications for extensions of time.
- 2.2.15 The Architect will prepare technical documentation for Change Orders when directed by the Project Manager.
- 2.2.16 The Architect and the Project Manager will conduct inspections to determine the dates of Substantial Completion and Final Completion, and will issue a final Certificate of Substantial Completion.
- 2.2.17 Unless otherwise provided in the Contract Documents, or the Owner-Architect Agreement, the Architect will prepare a set of reproducible record prints of Drawings showing significant changes in the Work made during the construction process, based on neatly and clearly marked-up prints, Drawings, and other data furnished by the Contractor.
- 2.2.18 In case of the termination of the employment of the Architect, the Owner may appoint an architect against whom the Contractor makes no reasonable objection whose status under the Contract Documents shall be that of the former architect, or the Owner may have the Project Manager assume all of the services of the Architect thereafter.

2.3 ASBESTOS ABATEMENT ARCHITECT

- 2.3.1 Solely with regards to asbestos abatement, the Asbestos Abatement Architect shall be afforded the same rights and authority as hereinbefore allowed the Architect.

2.3.2 The Architect is not a part of the Asbestos Abatement Architect's organization.

2.4 SEPARATE ARCHITECT, ENGINEER OR ARCHITECT/ENGINEER

2.4.1 Unless otherwise noted in the Contract Documents, the Separate Architect, Engineer or Architect/Engineer, as defined by the Supplementary General Conditions, Document 00800, shall be afforded the same rights and authority as hereinbefore allowed the Architect.

2.4.2 The Contract Documents, when applicable, shall define the portion of the Work relating to the services of the Separate Architect, Engineer or Architect/Engineer.

END OF ARTICLE 2

ARTICLE 3

OWNER

3.1 DEFINITIONS

- 3.1.1 The Owner is the Anchorage School District acting through its legally constituted officials, officers, employees, or agents and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Owner means the Owner or its authorized representative or agent.
- 3.1.2 The Asbestos Abatement Consultant is under separate Agreement with the Owner. Communications protocol between the Contractor and the Asbestos Abatement Architect shall be as established by the Project Manager.

3.2 PROJECT MANAGER

- 3.2.1 The Project Manager will be the Owner's representative and agent to the Contractor with respect to the Project during construction and until the issuance of the final Certificate for Payment. The term Project Manager is referred to throughout the Contract Documents as if singular in number and masculine in gender. The Owner's communications with the Contractor and the Architect will be through the Project Manager, who will have full authority to act on behalf of the Owner with regard to all aspects of the Project except that the Owner must approve all Change Orders and payments to the Contractor. The Project Manager's actions with regard to this project will be as an agent and representative of the Owner.
- 3.2.2 The Project Manager is not authorized to revoke, alter, change, relax, or release any requirements of the Contract, nor to approve or accept any portion of the Work not executed in accordance with, nor to issue instructions contrary to, the Contract Documents.
- 3.2.3 Nothing contained within the Contract Documents shall create any contractual relationship between the Project Manager and the Contractor.

3.3 INFORMATION, SERVICES AND RIGHTS OF THE OWNER

- 3.3.1 The Owner, through the Project Manager, will provide administration of the Contract as hereinafter described.
- 3.3.2 The Owner and the Project Manager shall at all times have access to the Work whenever it is in preparation or progress. The Contractor shall provide safe facilities for such access.
- 3.3.3 The Owner and the Project Manager shall not be responsible for or have control or charge of the construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work and will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Project Manager will not be responsible for the acts or omissions of the Contractor, any Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.
- 3.3.4 The Project Manager shall have authority on behalf of the Owner to condemn or reject Work when, in the Project Manager's opinion the Work does not conform to the Contract Documents. Whenever, in the Project Manager's reasonable opinion, it is considered necessary or advisable to insure the proper implementation of the intent of the Contract Documents, the Project Manager shall have the authority to require special inspection or

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

testing of any Work in accordance with the provisions of the Contracts Documents, whether or not such Work be then fabricated, installed, or completed.

- 3.3.5 The Project Manager will have authority to require additional inspection or testing of the Work in accordance with Subparagraph 7.7.3, whether or not such Work be then fabricated, installed, or completed. However, neither the Project Manager's authority to act under Subparagraphs 3.3.4 and 3.3.5, nor any decision made by the Project Manager in good faith either to exercise or not to exercise such authority shall give rise to any duty or responsibility of the Project Manager to the Contractor, any Subcontractor, any of their agents or employees, or any other persons performing any of the work.
- 3.3.6 The Project Manager shall have the authority and discretion to call, schedule, and conduct job meetings to be attended by the Contractor, and representatives of his Subcontractors, and Material Suppliers, and Vendors and the Architect, to discuss such matters as procedures, progress, changes, problems, claims and scheduling.
- 3.3.7 The Project Manager will establish procedures to be followed for processing all Shop Drawings, catalogs, and other project reports, and other documentation, test reports, and maintenance manuals.
- 3.3.8 The Project Manager will review all requests for changes and shall implement the processing of Change Orders, including applications for extension of the Contract time.
- 3.3.9 Project scheduling shall occur as set forth in Division 1, Section 01311 of the General Requirements, entitled "Schedules and Reports". The Owner and the Project Manager will not be responsible for the failure of the Contractor to plan, schedule, and execute the Work in accordance with the Contractor's accepted schedule or the failure of the Contractor to meet the Project Schedule Milestone Dates as set forth under Section 00200 hereof or the failure of the Contractor to schedule and coordinate the Work of his own trades and Subcontractors, and Material Suppliers and Vendors, or the failure of the Contractor to coordinate and cooperate with other separate contractors.
- 3.3.10 The Project Manager, in consultation with the Architect, will review and process all Applications for Payment by the Contractor, including the final Application for Payment.
- 3.3.11 The Owner and the Project Manager will not be responsible for the acts or omissions of the Contractor, or any Subcontractor, or Material Supplier and Vendor, or any contractor's, subcontractor's or Material Supplier's and Vendor's agents or employees, or any other persons performing any of the Work.
- 3.3.12 The Owner shall, if requested by the Contractor, furnish all existing and available surveys describing the physical characteristics, legal limitations and utility locations for the site of the Project.
- 3.3.13 Except as otherwise provided in the Contract Documents, the Owner shall pay for necessary easements required for permanent structures or for permanent changes in existing facilities. The Contractor shall be responsible for obtaining all necessary permits and coordinating the securing of easements, inspections and approvals for permanent structures and all associated work.
- 3.3.14 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.
- 3.3.15 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, all copies of Drawings and Specifications, and such supplemental

documents as are reasonably necessary for the execution of the Work.

- 3.3.16 The foregoing rights are in addition to other rights of the Owner enumerated herein and those provided by law.

3.4 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

- 3.4.1 The Owner reserves the right to perform other work at the project site(s) with his own forces, and to award separate contracts in connection with portions of other work on the site.
- 3.4.2 The Contractor shall afford the Owner and separate Contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their Work, and shall coordinate his Work with theirs as required by the Contract Documents.
- 3.4.3 A pre-construction conference will be held with the Contractor, Project Manager, and other contractors performing work at the project site, for the purpose of coordinating work in areas where more than one contractor may be working. The time of the meeting will be established by the Owner's Representative prior to the Contractor commencing his work.
- 3.4.4 The Contractor shall attend additional coordination meetings, as requested by the Owner's Representative.

3.5 OWNER'S RIGHT TO STOP OR TO SUSPEND THE WORK

- 3.5.1 If the Contractor fails to correct defective Work as required by Paragraph 13.2 or fails to carry out the Work or supply labor and materials in accordance with the Contract Documents, the Owner, through the Project Manager, by a written order may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Project Manager to stop the Work on behalf of the Owner shall not give rise to any duty on the part of the Project Manager to exercise this right for the benefit of the Contractor or any other person or entity.
- 3.5.2 The Project Manager may order the Contractor in writing to suspend, delay, or interrupt all or any part of the Work for such period of time as he may determine to be appropriate for the convenience of the Owner.
- 3.5.3 Upon receipt of any such suspension order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize incurring costs allocated to the Work covered by the order during the period of Work suspension.
- 3.5.4 If the performance of all or any part of the Work is suspended, or delayed, or interrupted by the Owner or the Project Manager pursuant to Subparagraph 3.5.2, the Contractor may make application for an adjustment in contract time and contract sum pursuant to Paragraph 12.2, and Division 1, Section 01311, Paragraph 2.03, respectively. No such adjustment shall be made if the performance of the Work is suspended by the Owner pursuant to Subparagraph 3.5.1.

3.6 OWNER'S RIGHT TO CARRY OUT THE WORK

- 3.6.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within seven (7) days after receipt of written notice from the Project Manager to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, after seven (7) days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy he may have,

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

make good such deficiencies and may further elect to complete all Work thereafter through such means as the Owner may select, including the use of a new Contractor. In such a case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including additional Owner administrative and legal costs, and compensation for the Architect's and the Project Manager's additional services made necessary by such default, neglect or failure. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

3.7 AUDIT

- 3.7.1 The Owner shall have access to the Contractor's books, accounts, records, invoices and other records and documents pertaining to the Project at all reasonable times for the purpose of inspecting and auditing such. The Contractor shall provide to the Owner his daily manpower and equipment reports for all Subcontractors and any and all information requested or required by the Owner to validate or verify an Application for Payment, claim for cost or a requisition. The Contractor shall have no right to additional compensation or time in the event a requisition is delayed due to the inability of the Owner to validate or verify an Application for Payment due to the failure or refusal of the Contractor to allow such inspection or audit or to provide such requested information.
- 3.7.2 The Contractor shall maintain all data and records pertinent to the Work performed under this Contract in accordance with generally accepted accounting principles, and shall preserve and make available all data and records until the expiration of three (3) years from the date of final payment under this Contract, or for such longer period, if any, as is required by applicable statute, pending litigation, or by other articles of this Contract. The Owner and its authorized representatives shall have access to all such data and records for such time period to inspect, audit and make copies thereof during normal business hours.
- 3.7.3 The Contractor covenants and agrees that it shall require that any Subcontractor and any Sub-Subcontractor utilized in the performance of this Contract shall permit the authorized representatives of the Owner to similarly inspect and audit all data and records of said Subcontractors and Sub-Subcontractors relating to the performance of said Subcontractors and Sub-Subcontractors under this Contract for the same time period specified above.

END OF ARTICLE 3

ARTICLE 4

CONTRACTOR

4.1 DEFINITION

4.1.1 The Contractor is the person or organization identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative, who shall have the authority to bind the Contractor in all matters pertinent to this Contract.

4.2 REVIEW OF CONTRACT DOCUMENTS

4.2.1 Before placing his proposal to the Owner, and continuously after execution of the Contract, the Contractor shall carefully study and compare the Contract Documents and shall at once report to the Owner, through the Project Manager, any error, inconsistency or omission he may discover, including any requirement which may be contrary to any law, ordinance, rule, regulation or order of any public authority bearing on the performance of the Work. By submitting his proposal or bid for the Contract and the Work under it, the Contractor agrees that the Contract Documents appear accurate, consistent, and complete insofar as can reasonably be determined. If the Contractor has reported in writing an error, inconsistency or omission, has promptly stopped the affected work until otherwise instructed, and has otherwise followed the instructions of the Owner, the Contractor shall not be liable to the Owner for any damage resulting from any such errors, inconsistencies or omissions in the Contract Documents. The Contractor shall perform no portion of the Work at any time without Contract Documents and, where required, approved Shop Drawings, Product Data or Samples for such portion of the Work.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The Contractor shall supervise and direct the Work, using his best skill and attention. He shall be solely responsible for and have control over all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

4.3.2 The Contractor shall be responsible to the Owner for the acts and omissions of his employees, Subcontractors, and Material Suppliers and Vendors, and their agents and employees, and other persons performing any of the work.

4.3.3 The Contractor shall not be relieved from his obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Architect or the Project Manager in their administration of the Contract, or by inspections, tests or approvals (or the lack thereof) required or performed under Paragraph 7.7 by persons other than the Contractor.

4.3.4 Independent of this Contract, the Owner has undertaken a long term asbestos abatement program by which the Owner intends to properly document the existence of asbestos-contained materials and the lawful removal of ACM by qualified asbestos abatement contractors or subcontractors in accordance with the Asbestos Hazard Emergency Response Act (AHERA) and the Asbestos School Hazard Abatement Reauthorization Act (ASHARA). As part of this asbestos abatement program, the Owner has employed a private consultant to locate asbestos-containing materials present in the Owner's facilities. A copy of the AHERA report as it relates to the facility which is involved in this Contract can be obtained from the Owner by contacting the Project Manager.

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

- 4.3.4.1 Before starting the Work or any Section of the Work, the Contractor shall inspect or, if using a Subcontractor for a Section of the Work, shall cause his Subcontractor to inspect all preparatory work, including that performed prior to the commencement of the Work under this Contract, for the presence of suspected asbestos-containing materials.
- 4.3.4.2 If the Contractor or his Subcontractor encounters any asbestos-containing material or suspected asbestos-containing material -- whether such material is identified in the AHERA report or the private consultant's report or not -- the Contractor shall bring it to the immediate attention of the Project Manager by timely written notice. Such notification shall be considered timely if received by the Project Manager within two (2) days after the discovery of the asbestos-containing material or suspected asbestos-containing material by the Contractor or by a Subcontractor if the Contractor uses a Subcontractor to perform that Section of the Work. If the Contractor does not give timely notice of the presence of asbestos-containing material or suspected asbestos-containing material, the Contractor will not receive additional compensation for delay caused by the necessity of the Owner to stop work and abate asbestos-containing material during the course of the Work. Failure of a Subcontractor to report the presence of asbestos-containing material or suspected asbestos-containing material to the Contractor shall not relieve the Contractor of his responsibilities hereunder.
- 4.3.4.3 If the Contractor, or his employees, agents or subcontractors intentionally or negligently disturbs or removes, or causes to be disturbed or removed, all or a portion of asbestos-containing material, the Contractor shall indemnify, hold harmless and defend the School District and the Project Manager from and against any claims, damages, losses and expenses, and alleged claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from any cleanup/decontamination work, medical treatment, or legal action arising or resulting from said intentional or negligent disturbance or removal of asbestos-containing material.
- 4.3.5 The Contractor shall make all necessary arrangements and so conduct the Work that all parts of the same will be carried out simultaneously and harmoniously and that the work of installing the various sections or items of same shall not interfere with or retard the progress of other Work.
- 4.3.6 If it becomes necessary at any time during the progress of the Work to move materials and/or equipment which have been temporarily located or stored, the Contractor shall move them or cause them to be moved, at his expense. Care shall be taken that no part of the Work shall be overloaded at any time.
- 4.3.7 The Contractor shall furnish all required information to ensure continuity between various sections of the Work and to avoid delay and obviate defects on any part of the whole Work, all as approved by the Owner.
- 4.3.8 Any damage caused by the handling or installation of materials or equipment, or the carrying out of any portion of the Work must also be made good by the Contractor to the satisfaction of the Project Manager.
- 4.3.9 The Contractor shall compare all the various drawings, and shall install Work in a manner to provide for all clearances and finishes indicated thereon. Work under each trade shall be arranged to clear piping, equipment, etc., of all other trades.
- 4.3.10 The Contractor shall inform himself fully regarding any peculiarities and limitations of the

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

space available for the installation of the material. He shall see that all equipment, such as valves, or other appliances necessary to be reached from time to time for operations and maintenance are made readily accessible.

- 4.3.11 The construction of the Work may develop conditions that render impracticable the location of equipment as shown or noted. In such cases, before installing his Work, the Contractor shall call the condition to the attention of the Project Manager for resolution.
- 4.3.12 It shall be the Contractor's sole responsibility to so coordinate the Work that chases or other recesses in walls shall be provided where required, and that reasonable clearance between the work of various trades shall be maintained. The layout for openings and chases through walls, floors, and partitions, etc., shall be arranged in advance of the actual construction and the work carried out without unnecessary and superfluous cutting, etc., after the Work has been completed.
- 4.3.13 Dimensions shall be verified by the measurements of the buildings and the property, and the Contractor shall be responsible for all of his work fitting in place in a satisfactory and workmanlike manner.
- 4.3.14 The Contractor has carefully examined, in detail, all of the Drawings and Specifications and the time established for completion of the Work, and he accepts them as adequate to meet the requirements specified.
- 4.3.15 The Contractor shall be responsible for coordinating the work performed by any artist in connection with the project's ornamentation with the construction of this project, so that there shall be no unnecessary delay or interference in connection with said construction.
- 4.3.16 The Contractor shall coordinate and generally supervise the Work of this Contract and shall coordinate his Work with Work performed under Separate Contracts by mutual arrangement and agreement with the Contractors for those Contracts and the Project Manager. Unresolved disputes will be finally resolved by the Project Manager, subject to approval of the Owner, and the dispute resolution provisions of Subparagraph 12.5.

4.4 LABOR AND MATERIALS

- 4.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the execution and completion of the Work in accordance with the Contract Documents, and any applicable building permit, conditional and final certificate(s) of occupancy, code or statute, whether specifically required by the Contract Documents or whether their provision may reasonably be inferred as necessary to produce the intended results, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.
- 4.4.2 The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him. The Project Manager may, by notice in writing, require the Contractor to promptly remove from the site of the Work any employee or worker the Project Manager deems incompetent, careless or otherwise objectionable including violation of District Policies relating to alcohol, illegal drugs, or firearms on District property.
- 4.4.3 The Contractor shall be responsible for ensuring that the Work is completed in a skillful and workmanlike manner.

4.5 WARRANTY

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

- 4.5.1 The Contractor warrants to the Owner and the Architect that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not conforming to these requirements, including substitutions not properly approved and authorized, is defective. If required by the Project Manager or the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty is not limited by the provisions of Paragraph 13.2.
- 4.5.2 The warranties set forth in this Paragraph 4.5 and elsewhere in the Contract Documents shall survive final acceptance under Paragraph 9.9.
- 4.6 TAXES
- 4.6.1 The Contractor shall pay all sales, consumer, use and other similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted at the time bids are received, whether or not yet effective.
- 4.7 PERMITS, FEES AND NOTICES
- 4.7.1 Except as specifically provided in Subparagraph 3.3.13 the Contractor shall secure and pay for (1) all permits and governmental fees, licenses and inspections necessary for the proper execution of the Work which are legally required at the time the bids are received, and (2) all permits and governmental fees, licenses and inspections from any agency or department of the Municipality of Anchorage that would be necessary for the proper execution of the Work or legally required at the time bids are received just as if the Work were performed and the Project located within the Municipality of Anchorage. The Municipality of Anchorage shall be considered a "public authority bearing on the performance of the Work" and a "public authority having jurisdiction" for purposes of this Contract.
- 4.7.1.1 The Anchorage School District has paid for the Municipality of Anchorage's Building Plan Review and Building Fee Permit. Contractor shall obtain permit upon notice from Project Manager.
- 4.7.2 The Contractor shall give all notices and comply with all such laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work.
- 4.7.3 If the Contractor performs any Work knowing it to be contrary to any such laws, ordinances, rules, regulations or orders of any public authority bearing on the performance of the Work, and does so without reasonable notice to the Project Manager, the Contractor shall assume full responsibility therefore and shall bear all costs attributable thereto.
- 4.7.4 Notification, coordination and completion of the installation of all required utilities, whether temporary or permanent, is the sole responsibility of the Contractor. The Owner shall not be responsible for any damage or delay caused by any party's inability to perform installations in the time frame desired by the Contractor.
- 4.8 ALLOWANCES
- 4.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by these allowances shall be supplied for such amounts and by such persons as the Owner may direct, but the Contractor will not be required to employ persons against whom he makes a reasonable objection.

4.8.2 Unless otherwise provided in the Contract Documents:

- 4.8.2.1 These allowances shall cover the cost to the Contractor, less any applicable trade discount, of the materials and equipment required by the allowance delivered at the site, and all applicable taxes;
- 4.8.2.2 The Contractor's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in the allowances;
- 4.8.2.3 Whenever the cost is more than or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order, the amount of which will recognize changes, if any, in handling costs on the site, labor, installation costs, overhead, profit and other expenses.

4.9 SUPERINTENDENT

- 4.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance full-time at the Project Site during the progress of the Work. The superintendent shall represent the Contractor, and all communications given to the superintendent shall be as binding as if given to the Contractor. If requested by the Project Manager, the Contractor shall provide a management chart and a list of personnel in a number stipulated by the Project Manager which shall comprise the superintending staff. In such event, all references to the superintendent elsewhere in the Contract Documents shall mean the superintending staff.
- 4.9.2 The superintendent shall be in attendance at the Project Site not less than eight (8) hours per day, five (5) days per week, unless the job is closed down due to a general strike or conditions beyond the control of the Contractor or until termination of the Contract in accordance with the Contract Documents. The superintendent shall not be employed on any other project during the course of the Work.
- 4.9.3 In the event any of the following conditions shall exist, the Contractor shall require that his superintendent be at the Project Site not less than ten (10) hours per day, six (6) days per week:
 - 4.9.3.1 Should Substantial Completion not be accomplished on schedule.
 - 4.9.3.2 Should Final Completion not be accomplished on schedule.
 - 4.9.3.3 Should the Contractor's progress schedule indicate the Contractor to be fourteen (14) or more days behind schedule at any time during construction up until thirty (30) days prior to scheduled Substantial Completion.
 - 4.9.3.4 Should the Contractor's progress schedule indicate the Contractor to be seven (7) or more days behind schedule at any time during the last thirty (30) days prior to scheduled Substantial Completion.

4.10 CONSTRUCTION SCHEDULE

- 4.10.1 The Contractor shall prepare and submit to the Project Manager for the Owner's review and acceptance a construction schedule pursuant to and in accordance with Division 1, Section 01311 of the General Requirements entitled "Project Schedule."

4.11 DOCUMENTS AND SAMPLES AT THE SITE

4.11.1 The Contractor shall maintain at the site for the Owner one record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data and Samples. These shall be available to the Project Manager and the Architect and shall be delivered to the Project Manager upon substantial completion of the Work.

4.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

4.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

4.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, diagrams, and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.

4.12.3 Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

4.12.4 The Contractor shall review, approve and submit using the ASD Procore Construction Management Program, with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any separate contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents, or subsequently by the Project Manager. The Contractor's Shop Drawings, Product Data, and Samples submissions shall be coordinated and consistent with the Contractor's Project Scheduling obligations under Division 1, Section 01311 of the Contract Documents. Shop Drawings and Samples shall be properly identified as specified, or as the Project Manager may require. At the time of submission, the Contractor shall inform the Architect in writing of any deviation in the Shop Drawings or Samples from the requirements of the Contract Documents.

4.12.5 By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Contractor shall adhere to any supplementary processing and scheduling instruction pertaining to Shop Drawings which may be issued by the Project Manager.

4.12.6 The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Architect's approval and Project Manager's review of Shop Drawings, Product Data or Samples under Subparagraph 2.2.14 unless the Contractor has specifically informed the Architect and Project Manager in writing of such deviation at the time of submission and the Architect and Project Manager have given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omission in the Shop Drawings, Product Data or Samples by the Architect's approval of or Project Manager's review thereof.

4.12.7 The Contractor shall promptly make corrections required by the Architect and shall resubmit the required number of corrected copies of Shop Drawings or new Product Data or Samples. The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

Architect on previous submittals. Resubmittals necessitated by required corrections due to Contractor's errors or omissions, or less than complete submittals as required by the specifications, shall not be cause for extension of Contract Time.

- 4.12.8 The Contractor shall keep on the job at all times copies of approved Shop Drawings, Product Data or Samples which bear the review stamp of the Architect/Engineer.
- 4.12.9 The review of Shop Drawings, Product Data or Samples by the Architect and Project Manager shall not relieve the Contractor from his responsibility to coordinate the work of the Subcontractors.
- 4.12.10 The review of Shop Drawings, Product Data or Samples by the Architect and the Project Manager shall not relieve the Contractor of his responsibilities to construct the work in accordance with the Contract Documents.
- 4.12.11 The review of Shop Drawings, Product Data or Samples by the Architect shall not be construed as an approval of the quantities of materials or confirmation of dimensions.
- 4.12.12 In preparing a schedule for delivery of materials the Contractor shall allow reasonable time for the approval, including resubmissions due to Contractor's errors and omissions, of Shop Drawings, Product Data or Samples.
- 4.12.13 When Shop Drawings, Cuts, or Brochures are forwarded to the Architect by the Contractor for approval, a copy of the Contractor's letter of transmittal with project name, Contractor's name, number of drawings, title and other pertinent data covering each transaction is to be mailed to the Project Manager. The Architect and his consulting Engineers shall follow the same procedure when it is necessary for them to return or transfer Shop Drawings, Cuts or Brochures either between themselves or to the Contractor for changes, corrections or resubmittal, so that the Project Manager can record and follow procedure for each transaction to finality.
- 4.12.13.1 Pursuant to and consistent with the Contractor's Project Schedule development obligations under Division 1, Section 01311 of the Contract Documents, the Contractor shall submit Shop Drawings, Product Data and Sample submission schedule information to the Architect and Project Manager. The Contractor shall submit, and the Architect and Project Manager will review, the Contractor's submittals in accordance with the Contractor's accepted Preliminary and Detailed Project Schedules, as required under Division 1, Section 01311 of the Contract Documents. The Contractor shall submit no Shop Drawings, Product Data or Samples which do not comply with the Contract Documents.
- 4.12.13.2 No portion of the Work requiring a Shop Drawing, Product Data or Sample submission shall be commenced until such submission has been reviewed, and approved, by the Architect in accordance with Subparagraph 2.2.13. All such portions of the Work shall be in accordance with approved submittals.
- 4.12.13.3 No claim for delay shall be allowed the Contractor on account of failure of the Architect to furnish drawings or approval of Shop Drawings and Samples until at least twenty-one (21) days after submission to the Architect.
- 4.12.14 Shop Drawings, Product Data, and Samples shall be dated and shall bear the name of the Project; a description or the names of equipment, materials and items; and complete identification of locations at which materials or equipment are to be installed.

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

- 4.12.15 In submitting for approval the use of any material or device as the equal of some other material or device specified by name, the Contractor shall submit a sample of the material specified and also a sample of the material proposed to be submitted as the equal thereof, together with any supporting data necessary to reasonably allow the Architect and the Project Manager to review the material.
- 4.12.16 In case of devices, samples of which cannot readily be submitted, catalogs and other data, shall be submitted.
- 4.12.17 Any material or device proposed to be substituted shall not be deemed acceptable except by written communication from the Architect and Project Manager.
- 4.12.18 All Work for which samples are required to be submitted and approved shall be executed and performed in conformity with the said approved samples.

4.13 USE OF SITE

- 4.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the building or site with any materials or equipment.
- 4.13.2 The Contractor shall coordinate all of his operations with and secure approval from the Project Manager before using any portion of the site.
- 4.13.3 All Work or materials of every description subject to injury during the course of the Work shall be fully protected from damage from any source. In any event, should any Work or materials under this Contract, become damaged in any way or manner the Contractor shall repair and perfect the same at his own expense, and when the entire Contract is completed, the building and premises shall be delivered to the Owner without defects. Any damage which may be caused by the installation of any portion of the Work covered by these specifications and conditions, or by the Contractor shall be satisfactorily made good and repaired by the Contractor without cost to the Owner.
- 4.13.4 The Contractor shall provide and maintain all lights, footways, guards, fences, gates, etc., for the proper protection of the public, and shall comply with all municipal rules, regulations, ordinances and laws, relating to the prosecution of his work.
- 4.13.5 The Contractor shall properly and carefully shore up or otherwise support all live water, sewer and gas pipes, electric wires, free-standing walls, conduit, etc., which may be encountered.
- 4.13.6 The Contractor shall furnish for his use, throughout the entire construction all scaffolding, ladders, decking or runways as needed to perform the Work under this Contract.
- 4.13.7 The Contractor shall construct elevators, cranes and other rigging, concrete lifts, etc., as required for his Work.
- 4.13.8 All such construction shall be carried out as required by the code or authority having jurisdiction. No cranes or other heavy equipment shall be located or moved in such manner as to damage or strain the framework or any part(s) of the proposed building and/or existing building.
- 4.13.9 As construction proceeds, the Project Manager may deem it necessary to have the Contractor move trailers, fences, stored materials, etc., to facilitate the construction. Upon written notice from the Project Manager, this will be done without additional cost to the

Owner.

- 4.13.10 When school is in session the Contractor will be restricted to the areas which do not interfere with school operations. These areas shall be safety and security fenced to not impact school operations. Additional areas may be utilized upon concurrence of the Project Manager. The Contractor shall minimize his impact on the educational program while his work is in progress. Workers must stay out of school while school is in session. All work in the existing school can only take place during the hours approved by the Project Manager
- 4.13.11 The Contractor must maintain interior building fire exits through the construction areas and maintain these exits during all school operation hours, to the satisfaction of the Authorities having Jurisdiction. These exit routes may not be modified without concurrence of the Project Manager and the School Principal.
- 4.13.12 The Contractor must maintain fire equipment access routes open to site and buildings. According to UFC 10.502 fire equipment access and water supplies shall be installed and made serviceable prior to and during the time of construction. This is the Contractor's responsibility to coordinate.
- 4.13.13 The Contractor shall keep the boilers operational while the average outside temperature is below 60° F while the school program is in operation or at any time temperature is below 40° F, to protect facility utility systems.

4.14 CUTTING AND PATCHING OF WORK

- 4.14.1 The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the Work or to make its several parts fit together properly.
- 4.14.2 The Contractor shall not damage or endanger any portion of the Work or the work of the Owner or any separate contractors by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate Contractor except with the written consent of the Owner and of such separate Contractor. The Contractor shall not unreasonably withhold, from the Owner, or any separate contractor his consent to cutting or otherwise altering the Work.
- 4.14.3 Existing structures and facilities including but not limited to building, utilities, topography, streets, curbs, walks, etc., that are damaged or removed due to required excavations or other construction work, shall be patched, repaired or replaced by the Contractor to the satisfaction of the Project Manager, the owner of such structures and facilities, and authorities having jurisdiction. In event the local jurisdictional authorities require that such repairing and patching be done with their own labor and materials, the Contractor shall abide by such regulations and pay for such work.
- 4.14.4 Whenever, for the convenience of work, an oversized opening has been provided, it shall be the responsibility of the Contractor requesting and requiring such opening to eventually fill unused portions of such openings with the appropriate material and with special attention to penetrations of firewalls. Such repair shall be in accordance with Paragraph 4.14.1.

4.15 CLEANING UP

- 4.15.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work he shall remove all his waste materials and rubbish from and about the Project as well as all his

tools, construction equipment, machinery and surplus materials.

4.15.2 If the Contractor fails to clean up during or at the substantial or final completion of his Work, the Owner may do so as provided in Paragraph 6.3 and the costs thereof shall be charged to the Contractor.

4.16 COMMUNICATIONS

4.16.1 The Contractor shall forward all communications to the Architect or the Owner through the Project Manager, except as described under Paragraph 4.12.13.

4.17 ROYALTIES AND PATENTS

4.17.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof, except that the Owner shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified, but if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Project Manager.

4.18 INDEMNIFICATION

4.18.1 To the fullest extent permitted by law, the Contractor shall, at his sole cost and expense, indemnify, hold harmless and defend the Owner, the Municipality of Anchorage and their Board or Assembly members, administrators, representatives, and employees, and the Project Architect and its agents, representatives, and employees from and against all claims, actions, judgments, costs, liabilities, penalties, damages, losses and expenses, including but not limited to attorneys' fees, which arise out of or result from the performance of the Work, and which are:

4.18.1.1 Attributable to bodily injury, sickness, disease or death, or to injury to, pollution of, or destruction of property (other than the Work itself) including the loss of use resulting therefrom; and

4.18.1.2 Caused by the default of the Contractor, or by any act, whether negligent or wrongful, or omission of the Contractor, any Subcontractor, Material Supplier or Vendor, anyone directly or indirectly employed by any of them or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

4.18.2 In any and all claims against the Owner or the Municipality of Anchorage or their Board or Assembly members, administrators, representatives or employees, and the Project Architect and its agents, representatives, and employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.18 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor and Subcontractor under worker's compensation acts, disability benefit acts or other employee benefit acts.

4.19 PERSONS AUTHORIZED TO SIGN DOCUMENTS

4.19.1 The Contractor, within five (5) days after the Notice to Proceed shall file with the Project Manager a list of all persons who are authorized to sign documents such as contracts,

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

modifications, schedules, certificates, and affidavits on behalf of the Contractor and to fully bind the Contractor to all the Conditions and provisions of such documents, except that in the case of a corporation he shall file with the Project Manager a certified copy of a resolution of the Board of Directors of the corporation in which are listed the names and titles of corporation personnel who are authorized to sign documents on behalf of the corporation and to fully bind the corporation to all the conditions and provisions of such documents. This person, or at least one of these persons, shall be available to meet in Anchorage, Alaska, with the Owner or his representative(s) to discuss, negotiate and/or resolve any Change Order or other Modification to the Contract or any other matter needing resolution by the parties as determined at the sole discretion of the Owner within forty-eight (48) hours after receipt of written notice, at no additional cost to the Owner.

4.20 CONDITIONS AFFECTING THE WORK

- 4.20.1 The Contractor shall be responsible for taking all steps necessary to ascertain the nature and location of the Work and the general and local conditions which can affect the Work or the cost thereof. Failure by the Contractor to fully acquaint himself with conditions which may affect the Work, including, but not limited to conditions relating to transportation, handling, storage of materials, availability of labor, water, roads, weather, topographic and subsurface conditions, multi-prime contract conditions, applicable provisions of law, and the character and availability of equipment and facilities needed prior to and during the execution of the Work, shall not relieve the Contractor of his responsibilities under the Contract Documents and shall not constitute a basis for an adjustment in the Contract Sum or the Contract Time under any circumstances. The Owner assumes no responsibility for any understanding or representation about conditions affecting the Work made by any of his officers, employees, representatives, or agents prior to the execution of the Contract, unless such understandings or representations are expressly stated in the Contract Documents.
- 4.20.2 Until final acceptance by the Owner, the Contractor shall be in complete control of and fully responsible for the Work.
- 4.20.3 The Contractor shall give to the proper authorities all required notices relating to the Work in his charge, and shall be responsible for all acts and events which are violations of the law or which would be violations of the law had the Work been performed or the Project located within the Municipality of Anchorage.
- 4.20.4 Wherever herein mention is made of any article, material or workmanship to be in accordance with the laws, ordinances, building code, Underwriter's Code, and A.S.T.M. Specifications or similar expressions, the requirement of these laws, ordinances, etc., shall be construed as the minimum requirements of these Specifications, and all articles, materials and workmanship required by these laws, ordinances, etc., shall be provided by the Contractor without any additional cost to the Owner.
- 4.20.5 Where the requirements of the laws, ordinances, etc., are mandatory, they shall govern.
- 4.20.6 Where the requirements of the Specifications call for higher grade or are not in conflict with the laws, ordinances, etc., the Specifications shall govern.
- 4.20.7 In case of any apparent conflict between the Specifications and such laws, ordinances, etc., the Contractor shall immediately call the attention of the Project Manager (in writing) to such conflict for decision, before proceeding with any work which may involve such conflict.

END OF ARTICLE 4

ARTICLE 5

SUBCONTRACTORS

5.1 DEFINITION

- 5.1.1 A Subcontractor is a person, organization or entity who has a direct contract with the Contractor to perform any of the Work. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative. The term Subcontractor does not include any separate contractor or his subcontractors.
- 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform any of the Work. The term Sub-subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Sub-subcontractor or an authorized representative thereof.
- 5.1.3 Nothing contained in the Contract Documents is intended to, nor shall it create, any contractual relationship between the Owner, the Project Manager, the Architect, or any of their agents, employees, or representatives and any Subcontractor or Sub-subcontractor.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

- 5.2.1 The Contractor, in compliance with the requirements of the Contract Documents, shall furnish to the Project Manager in writing the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The Project Manager will within ten (10) days of receipt of such information reply to the Contractor in writing stating whether or not the Owner, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Project Manager to reply within a reasonable time shall constitute notice of no reasonable objection. The Contractor understands and agrees that no contractual agreement exists for any part of the Work under this Contract between the Owner and any of the Contractor's Subcontractors or Sub-subcontractors. Further, the Contractor understands and agrees that he alone is responsible to the Owner for all of the Work under this Contract and that any review of Subcontractors or Sub-subcontractors by the Owner or Project Manager will not in any way make the Owner responsible to any Subcontractor or Sub-subcontractor, nor responsible for the actions or failures of any Subcontractor or Sub-subcontractor.
- 5.2.1.1 Within ten (10) days after the Notice to Proceed, the Contractor shall furnish to the Project Manager, in writing, for acceptance by the Owner, a list of names of the Subcontractors, Sub-subcontractors, and Material Suppliers and Vendors, proposed for the principal portions of the Work.
- 5.2.1.2 Within thirty-five (35) days after Notice to Proceed, the Contractor shall submit to the Project Manager, copies of Purchase Orders or other satisfactory evidence of purchase for all major materials.
- 5.2.2 The Contractor shall not contract with any such proposed person or entity to whom the Project Manager has made reasonable objection under the provisions of this Subparagraph.
- 5.2.2.1 The Contractor shall not be required to contract with anyone to whom he has a reasonable objection. There shall be no entitlement to additional compensation based upon the Project Manager's reasonable objection made

under this Section.

- 5.2.3 If the Project Manager has reasonable objection to any such proposed person or entity, the Contractor shall submit a substitute to whom the Project Manager has no reasonable objection.
- 5.2.4 The Contractor shall make no substitution for any Subcontractor, person or entity previously selected if the Project Manager makes reasonable objection to such substitution.
- 5.2.5 During the course of the Project the Contractor must notify the Project Manager in writing regarding any changes in any Work by any Subcontractor, Sub-subcontractor, Material Supplier or Vendor.

5.3 SUBCONTRACTUAL RELATIONS

- 5.3.1 By an appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner. Said agreement shall preserve and protect the rights of the Owner under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with his Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph 5.3, and identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Documents available to his Sub-subcontractors, Material Suppliers or Vendors.
- 5.3.2 In addition to Sub-Contractual agreement in Paragraph 5.3.1, the Contractor shall allow the Subcontractor, Sub-subcontractor, Material Supplier or Vendor to notify the Project Manager due to failure of payment, unwarranted retainage or deductions of payment or unwarranted lateness of payment.
- 5.3.3 As a condition precedent to the acceptance of the Contractor's proposed Preliminary and Detailed Project Schedules by the Project Manager, each major Subcontractor shall in writing, with the submission of said schedules by the Contractor, confirm that they have reviewed the Contractor's proposed Project Schedules, and that each concurs with the activity breakdowns, durations, cost loading, and logic as relates to each major Subcontractor's scope of the Work and the incorporation of said Work into the Contractor's proposed Preliminary and Detailed Project Schedules, as prescribed under Division 1, Section 01311 of the General Requirements of the contract documents.

5.4 PREPARATORY WORK

- 5.4.1 Before starting work, the responsible Subcontractor shall carefully examine all preparatory Work that has been executed to receive his Work. He shall check carefully, by whatever means are required, to ensure that his work and adjacent related Work will finish to proper contours, planes, and levels. He shall promptly notify the Contractor and the Project

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

Manager of any defects or imperfections in preparatory Work which will, in any way, affect satisfactory completion of his Work. Absence of such notification will be construed as an acceptance of preparatory work and later claims of defects therein will not be recognized.

5.4.2 Each Subcontractor is required to follow the provisions of 4.3.4 relating to asbestos abatement.

5.5 PAYMENTS TO SUBCONTRACTORS, SUB-SUBCONTRACTORS, AND MATERIAL SUPPLIERS AND VENDORS

5.5.1 If the Project Manager withholds a Certificate for Payment for any cause which is the fault of the Contractor and not the fault of a particular Subcontractor, Sub-subcontractor, and Material Supplier and Vendor, the Contractor shall pay that Subcontractor, Sub-subcontractor, Material Supplier and Vendor on demand, made at any time after the Certificate for Payment should otherwise have been issued, for his work to the extent completed, less any retained percentage.

5.5.2 The Contractor shall pay each Subcontractor, Sub-subcontractor, and Material Supplier and Vendor a just share of any insurance monies received by the Contractor, and he shall require each Subcontractor to make similar payments.

END OF ARTICLE 5

ARTICLE 6

WORK BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

- 6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract.
- 6.1.2 When separate contracts are awarded for different portions of the Project or other work on the site, the term Contractor in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.
- 6.1.3 Upon transfer of such separate contracts to a General Contractor, if the Owner so desires to transfer such contracts, the Contractor shall be obligated to the conditions as outlined by Paragraph 6.3. of these Conditions.

6.2 MUTUAL RESPONSIBILITY

- 6.2.1 The Contractor shall afford the Owner and separate Contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their Work, and shall connect and coordinate his Work with theirs as required by the Contract Documents.
- 6.2.2 If any part of the Contractor's Work depends for proper execution or results upon the Work of the Owner or any separate contractor, the Contractor shall, prior to proceeding with the Work, promptly report to the Owner any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report in writing to the Owner shall constitute an acceptance of the Owner's or separate contractors' work as fit and proper to receive his Work, except as to defects which may subsequently become apparent in such work by others.
 - 6.2.2.1 In addition to inspection as to defect, the Contractor, if so deemed necessary by the Contractor, shall measure or inventory work already in place or stored and shall at once report, in writing, to the Project Manager any conflicts between the executed Work and the Contract Documents the Contractor has signed his name thereto.
 - 6.2.2.2 Upon notification from the Owner that a part of the Work furnished under this Contract is not in accordance with the Contract Documents, the Contractor shall immediately initiate action to correct the Work.
 - 6.2.2.3 If the Contractor fails to install his Work in a timely manner, the Owner through the Project Manager may authorize other Contractor(s) to perform their Work out of proper sequence. All extra Work necessary to properly interface with the other Contractor(s)' Work will be accomplished by this Contractor at no additional cost to the Owner.
- 6.2.3 Any costs caused by defective or ill-timed work shall be borne by the Contractor.
- 6.2.4 Should the Contractor wrongfully cause damage to the Work or property of the Owner, or to other Work on the site, the Contractor shall promptly remedy such damage as provided in Subparagraph 10.2.5.

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

- 6.2.5 Should the Contractor wrongfully cause damage to the work or property of any separate contractor, the Contractor shall upon due notice promptly attempt to settle with such other Contractor by agreement; or otherwise to resolve the dispute. If such separate Contractor sues or initiates a proceeding against the Owner, the Project Manager and/or the Architect on account of any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor who shall defend such proceedings at his own expense, and if any judgment or award against the Owner, the Project Manager, and/or the Architect arises therefrom the Contractor shall pay or satisfy it and shall reimburse the Owner, the Project Manager and/or the Architect for all attorneys' fees and court or other costs which the Owner, the Project Manager and/or the Architect have incurred.
- 6.2.6 In the event there is more than one contractor engaged on the Project, each such contractor shall be responsible to the other for damages to work, injury to any person or persons, or for any loss, cost, claims, or damages arising out of or in connection with the Work required by this Contract or any loss, cost, expense, or damage caused by the Contractor's neglect or failure to finish or satisfactorily complete his part of the Work within the time prescribed. In all events, the provisions of Paragraph 4.18 shall be applicable.
- 6.2.7 Whenever the Contractor receives items from another Contractor or from the Owner for storage, erection or installation, the Contractor receiving such items shall give receipt for items delivered, and thereafter will be held responsible for care, storage and any necessary replacing of item or items received.
- 6.2.8 The separate contractors shall establish and maintain communication throughout the course of their Work to assure maximum coordination of the Work performed by each. This includes the approvals of the Work of each as required by proper coordination.
- 6.3 OWNER'S RIGHT TO PERFORM DISPUTED WORK
- 6.3.1 If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up as required by Paragraph 4.15 or for accomplishing coordination or doing required cutting, filling, excavating or patching as required by Paragraph 4.14, the Owner may carry out such Work and charge the cost thereof to the contractors responsible therefor as the Owner shall determine to be just.
- 6.4 EQUIPMENT OR WORK NOT IN CONTRACT (NIC)
- 6.4.1 When certain items of equipment and other work are indicated as "NIC" (Not In Contract), or to be furnished and installed under other contracts, any requirements for preparation of openings, provision of backing, etc., for receipt of such "NIC" work, information will be furnished upon written request of the Contractor who shall properly form and otherwise prepare his Work in a satisfactory manner to receive such "NIC" work.
- 6.5 CUTTING AND PATCHING UNDER SEPARATE CONTRACTS
- 6.5.1 Each Contractor shall be responsible for any cutting, fitting and patching that may be required to complete his Work except as otherwise provided in the Contract Documents. The Contractor shall not endanger any human life or portion of the Work performing any cutting, excavating or otherwise altering the Work or any part thereof.

END OF ARTICLE 6

ARTICLE 7

MISCELLANEOUS PROVISIONS

7.1 GOVERNING LAW

7.1.1 Unless otherwise provided in the Contract Documents, the Contract shall be governed by the law of the place where the Project is located.

7.2 SUCCESSORS AND ASSIGNS

7.2.1 The Owner and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. The Contractor shall not assign the Contract or sublet it as a whole without the written consent of the Owner, nor shall the Contractor assign any monies due or to become due to him hereunder, without the previous written consent of the Owner.

7.3 WRITTEN NOTICE

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or entity or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known to him who gives the notice.

7.4 CLAIMS FOR DAMAGES

7.4.1 Should the Contractor suffer injury or damage to person or property because of any act or omission of the Owner or of any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to the Owner, through the Project Manager, within twenty (20) days after the first observance of such injury or damage; otherwise, the Contractor shall have waived any and all rights he may have against the Owner, the Project Manager, the Architect, or their employees, representatives or agents.

7.4.2 Decisions of the Project Manager shall be rendered as provided for under the Contract Documents, but no decision of the Project Manager shall deprive the Owner or the Contractor of any form of redress which may be available under the laws of the State. Any decision of the Project Manager shall be final and binding on the Contractor in the absence of written notice of protest from the Contractor received by the Owner by registered mail, within fifteen (15) days of the date of the decision of the Project Manager. The Owner shall have sixty (60) days from the date of receipt of a formal protest within which to investigate and make reply.

7.5 PERFORMANCE BOND AND PAYMENT BOND

7.5.1 Prior to the execution of the Contract, the Contractor shall furnish to the Owner, on forms acceptable to the Owner, surety bonds in the amounts and for the purposes provided in this Paragraph 7.5. Each bond must be signed by both the Contractor and the Surety. The current power of attorney for the person who signs for the surety company, indicating the monetary limit of such powers, must be attached to the bonds. The Contractor shall pay all premiums and cost thereof and incidental thereto. Such bonds shall be made payable to the Owner. The surety (or sureties) shall be corporate surety(ies) licensed to transact business in Alaska and acceptable to the Owner. Each bond shall be in an amount equal to the Contract Sum. The effective date of the bond shall be on the execution date of the

contract.

- 7.5.2 The "Performance Bond" shall be so conditioned as to assure the faithful performance by the Contractor of all Work under said Contract, within the time limits prescribed, including any maintenance provisions, in a manner that is satisfactory and acceptable to the Owner; that all materials and workmanship supplied by him will be free from original or developed defects; and that should original or developed defects or failures appear within a period of one year from the date of final acceptance of the Work by the Owner, the Contractor shall, at his own expense, make good such defects and failures and make all replacements and adjustments required, within a reasonable time after being notified by the Owner to do so. This bond shall be maintained by the Contractor in full force and effect during the performance of the Work of the Contractor and for a period of two (2) years after the date of final acceptance of the Work by the Owner.
- 7.5.3 The "Payment Bond" shall be so conditioned as to inure to the benefit of persons furnishing materials for or performing labor upon the Work. This bond shall be maintained by the Contractor in full force and effect until the Work is completed and finally accepted by the Owner, and until all claims for materials, labor and subcontracts are paid.
- 7.5.4 Should any surety or sureties upon said bonds become insufficient or be disqualified from doing business in Alaska, the Contractor shall renew said bond or bonds with good and sufficient sureties, acceptable to the Owner, within ten (10) work days after receiving notice that the surety or sureties are insufficient and/or disqualified. Should any surety or sureties be deemed unsatisfactory at any time by the Owner, notice will be given the Contractor to that effect, and he shall forthwith substitute a new surety or sureties satisfactory to the Owner. No further payment shall be deemed due or will be made under this Contract until the new sureties shall qualify and be accepted by the Owner.
- 7.5.5 In the event of any change order resulting in the performance of additional work in connection with the Work, the amounts of such bonds shall be increased by the cost of such additional work or materials or fixtures to be incorporated into the Project.

7.6 RIGHTS AND REMEDIES

- 7.6.1 The Contractor's duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.
- 7.6.2 Except as may be specifically agreed in writing, the failure of the Owner, the Project Manager, or the Architect to insist in any one or more instances upon the strict performance of any one or more of the provisions of this Contract, or to exercise any right herein contained or provided by law, shall not be construed as a waiver or relinquishment of the performance of such provision or right(s) or of the right to subsequently demand such strict performance or exercise such right(s), and the rights shall continue unchanged and remain in full force and effect.
- 7.6.3 The Contractor agrees that he can be adequately compensated by money damages for any breach of this Contract which may be committed by the Owner and hereby agrees that no default, act, or omission of the Owner, the Project Manager or the Architect, except for unauthorized failure to make payments as required by the Contract Documents, shall constitute a material breach of the Contract entitling the Contractor to cancel or rescind the provisions of this Contract or (unless the Owner shall so consent or direct in writing) to suspend or abandon performance of all or any part of the Work. The Contractor hereby waives any and all rights and remedies to which he might otherwise be or become entitled, save only his right to money damages.

7.7 TESTS

- 7.7.1 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested, or approved, the Contractor shall give the Architect and Project Manager timely notice, but not less than seventy-two (72) hours, of its readiness so the Architect and the Project Manager may observe such inspection, testing or approval. The Contractor shall bear all costs of such inspections, tests or approvals except as provided in subparagraph 7.7.2. Notification, coordination and execution of all inspections and tests required by the Contract Documents or by the governing building department shall be the sole responsibility of the Contractor. The Owner shall not be responsible for any damage or delay caused by any Party's inability to make required inspections in the time frame desired by the Contractor.
- 7.7.2 Special Inspection and testing as required in accordance with IBC section 1704 shall be coordinated by the Contractor and the Owner shall bear all costs of Special Inspections or approvals. The Special Inspector, designated by the Owner, shall observe the Work assigned for conformance with the approved design drawings and specifications. The Project Manager may order additional Special Inspections, testing, or approval, as required by the authority having jurisdiction by providing notice to the Contractor. The Contractor shall provide notification and coordination for additional Special Inspections as provided in subparagraph 7.7.1. If such special inspection or testing reveals a failure of the Work to comply (1) with the requirements of the Contract Documents, or (2) with respect to the performance of the Work, with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, the Contractor shall bear all costs thereof, including compensation of the Owner's administrative and legal expenses, and for the Architect's, the Project Manager's, and the Special Inspector's additional services made necessary by such failure.
- 7.7.3 Inspections and Tests required to establish compliance with the Contract Documents, as provided for in the Contract Documents, will be made by a qualified, independent testing agency approved by the Owner. The cost of the services of such agency will be paid by the Contractor, unless otherwise provided in the Contract Documents. When the initial tests indicate non-compliance with the Contract Documents, any subsequent retesting occasioned by non-compliance shall be performed by the same agency and the costs thereof borne by the Contractor. The Contractor shall provide facilities for such access to the Work in order that the agency may properly perform its functions. Representatives of the testing agency shall have access to the Architect, Project Manager, or Owner at all times.
- 7.7.4 Inspections or testing performed exclusively for the Contractor's convenience shall be the sole cost and responsibility of the Contractor.
- 7.7.5 The independent testing agency, employed as specified in the Technical portion of these specifications, shall prepare the test reports, logs, and certificates applicable to the specific inspections and tests and shall deliver, immediately or within forty-eight (48) hours, as applicable, the specified number of copies of same to the designated parties. Other required certificates of inspection, testing or approval shall be secured by the Contractor and delivered by him to the Project Manager and the Architect, in such time as to not delay progress of the Work or final payment therefor.
- 7.7.6 If the Architect, the Project Manager or the Special Inspector is to observe the inspections, tests or approvals required by the Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction or that are required to establish compliance with the Contract Documents, he will do so promptly and, where

practicable, at the normal place of testing.

7.7.7 Unless otherwise stipulated in the Contract Documents, the Contractor shall pay for all utilities required for testing of installed equipment of all of his Work and work of each Subcontractor furnishing equipment. Labor and supervision required for making such tests shall be provided at no additional cost to the Owner.

7.7.8 Owner may provide Quality Assurance testing. Contractor shall provide knowledgeable support personnel and cooperate fully with Owner's designated representative in conducting all Quality Assurance tests. If project fails tests, Contractor shall make all necessary corrections to meet test criteria and pay the Owner for all costs associated with additional tests.

7.8 ALTERNATES

7.8.1 Alternates may be either additive or deductive.

7.8.2 Alternates, if taken, may be taken in any sequence.

7.8.3 The Contractor shall include in his bid, or bid proposal, a bid for all alternates listed in the Bid Form. These alternates shall include the Contractor's net cost of the labor, materials, overhead and profit, and equipment necessary to perform or delete, the Work as outlined by such alternates.

7.9 UNENFORCEABILITY OF ANY PROVISION

7.9.1 If any provision of the Contract is held as a matter of law to be unenforceable, the remainder of the Contract shall be enforceable without such provision.

7.10 NO WAIVER BY OWNER

7.10.1 The failure of the Owner in any one or more instances to insist upon the strict performance of any of the terms of this Contract or to exercise any option herein conferred, shall not be construed as a waiver or relinquishment to any extent of the right to assert or rely upon such terms or option on any future occasion.

7.11 ASSIGNMENT OF CONTRACT

7.11.1 The Contractor shall not assign the responsibilities of this Contract, either as a whole or in part, nor assign any monies due or to become due to it hereunder, without previous written consent of the Owner.

END OF ARTICLE 7

ARTICLE 8

TIME

8.1 DEFINITIONS

- 8.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for Substantial and Final Completion of the Work as defined in Subparagraph 8.1.3, including authorized adjustments thereto.
- 8.1.2 The date of execution of the Contract Agreement between the Owner and Contractor shall be subsequent to School Board Approval and the Contractor's satisfactory submittals to the Owner of the Certificate of Insurance, the Performance Bond and the Payment Bond as noted in the Invitation to Bidders. The Owner will issue a Notice to Proceed no later than ten (10) days from execution of the Owner-Contractor Agreement by both Owner and Contractor. The date of commencement of the Work shall be the date established by the Notice to Proceed. The Owner shall not be responsible for any costs incurred by the Contractor prior to the Notice to Proceed.
- 8.1.3 The Date of Substantial Completion of the Work or designated portion thereof is the Date certified by the Project Manager and Architect when the Work or a designated portion thereof is sufficiently complete, in accordance with the Contract Documents, so the Owner can fully occupy and utilize the Work or designated portion thereof for the use for which it is intended, with all of the Project's parts and systems cleaned and operable as required by the Contract Documents. Only incidental corrective work and any final cleaning beyond that needed for the Owner's full use may remain for Final Completion.
- 8.1.4 The term day as used in the Contract Documents shall mean calendar day unless otherwise specifically designated. All dates shall mean 12:01 a.m. of the indicated day unless otherwise stipulated.
- 8.1.5 The term "working day" as may be used in the Contract Documents shall mean any day not otherwise defined herein as a non-working day.
- 8.1.6 The term non-working day as may be used in the Contract Documents shall mean Sunday, a recognized holiday, a day on which the Contractor is specifically required to suspend construction operations or a day on which a suspension order is in effect. Recognized holidays shall be: New Year's Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, Christmas Eve (half day), and Christmas Day. When any of the above days fall on a Saturday, the preceding Friday shall be counted as a holiday. When any of the above days fall on a Sunday, the following Monday shall be counted as a holiday.
- 8.1.7 The term "Beneficial Occupancy" is interchangeable with the term Substantial Completion.

8.2 PROGRESS AND COMPLETION

- 8.2.1 All times stated in the Contract Documents are of the essence of the Contract.
- 8.2.2 The Contractor shall begin the Work on the date of commencement as defined in Subparagraph 8.1.2. He shall carry the Work forward expeditiously with adequate forces and shall achieve Substantial Completion and Final Completion in accordance with the Project Schedule Milestone Dates set forth under Section 00200 hereof.
- 8.2.3 Attention is directed to the fact that the Work is urgently needed by the Owner and that time is of the essence; for this reason, it shall be agreed that the Contractor shall

substantially complete all Work under the Contract in accordance with the Project Schedule Milestone Dates set forth under Section 00200 hereof and, that he will complete the contract in all its details for final acceptance as specified after Substantial Completion.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 The Contractor shall be entitled to extensions in the time required for performance of the Work as specifically provided in the Contract. Except as otherwise specifically provided under Paragraph 3.4., 12.1, or 8.3.5, the Contractor shall not be entitled to payment or compensation of any kind from the Owner for direct, indirect, impact or consequential damages, including but not limited to costs of acceleration because of hindrance or delay or loss of labor or equipment efficiency or productivity arising out of any hindrance, interference, obstruction, disruption or delay from any source or cause whatsoever, whether such hindrance, interference, obstruction, disruption or delays be reasonable or unreasonable, foreseeable or unforeseeable, or avoidable or unavoidable.

8.3.2 The Contract Time may be adjusted only for changes pursuant to Paragraph 12.1, suspension of Work pursuant to Paragraph 3.4. and delays pursuant to Subparagraph 8.3.3.

8.3.3 Types of delay shall be defined as follows:

8.3.3.1 Actions or inactions of the Owner, or events for which the Owner has assumed contractual responsibility, which would independently delay the date of Substantial Completion beyond the current contractually established date of Substantial Completion shall be designated as Compensable delays.

8.3.3.2 Events which are outside the control of, and without the fault or negligence of either the Owner or the Contractor, which would independently delay the date of Substantial Completion beyond the current Contract Completion Date shall be designated as Excusable delays, as follows:

8.3.3.2.1 Labor disputes and strikes (including strikes affecting transportation), that do, directly and critically affect the progress of the Work; however, any extension of Contract Time on account of an individual labor strike shall not exceed the number of days of said strike.

8.3.3.2.2 Acts of God, tornado, fire, hurricane, blizzard, earthquake, typhoon, or flood that damage completed work or stored materials.

8.3.3.2.3 The Contract Time will not be extended due to normal inclement weather. Unless the Contractor can substantiate to the satisfaction of the Owner that the weather actually encountered by the Contractor was unusually severe considering the full term of the Contract Time using a ten (10) year average of accumulated record mean values from climatological data compiled by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration for the locale of the Project and that such alleged substantially greater than normal inclement weather actually delayed the Work or portions thereof which had an effect upon the Contract Time, the Contractor shall not be entitled to an extension of time.

8.3.3.2.4 Acts of the public enemy, acts of the state, federal or local

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

government in its sovereign capacity, and acts of another contractor in the performance of a contract with the Owner relating to the Project.

8.3.3.3 Actions or inactions of the Contractor, or events for which the Contractor has assumed contractual responsibility, which would independently delay the date of Substantial Completion beyond the current Contract Completion Date shall be designated as Non-excusable delays.

8.3.3.4 Concurrent delay is any combination of the above three types of delay occurring on a calendar date, except in cases where the combination consists of two or more instances of the same type of delay occurring on a calendar date.

A delay to the Contractor caused by the acts of another contractor under contract to the Owner will be classified as a compensable delay to the extent said delay meets the requirements of compensable delay as set forth under Subparagraph 8.3.3.1. Also, it is the Owner's belief that the definitions of delay as included in this paragraph comply with all applicable law in the State of Alaska.

8.3.4 Any claim for extension of time shall be made in writing to the Project Manager not more than seven (7) calendar days after commencement of the delay; otherwise it shall be waived. The Contractor shall also provide an estimate of the probable effect of such delay on the progress of the Work. In the case of a continuing delay only one claim is necessary. Any event, action, inaction, or other cause which may give rise to a delay shall constitute a basis for adjustment in:

8.3.4.1 Contract Time, only if it can be demonstrated that the date of Substantial Completion will be delayed beyond the current Contract Completion Date and that the delay is classified as only a Compensable, Excusable, or Concurrent Delay. The Contract Time shall be adjusted by Change Order pursuant to the requirements of Paragraph 8.3 and Division 1, Section 01311; or

8.3.4.2 Contract Amount, only if it can be demonstrated that the Contractor's time-related costs to complete the Work will be increased and the delay is classified as only a Compensable Delay. The Contract Sum shall be adjusted by Change Order pursuant to the requirements of Subparagraphs 8.3 and 12.3.

8.3.5 All time limits stated in the Contract Documents are of the essence of this Contract. The failure of the Contractor to complete the Work in conformance with the Contract shall result in damages suffered by the Owner due to delays in completion of the Work.

8.3.5.1 If the Contractor fails to substantially complete the Work in conformance with the Contract Documents and the Owner nevertheless permits the Contractor to continue performance of the Work, such permission shall neither modify nor waive the Owner's right to assess and collect, and the Contractor's obligation to pay liquidated damages.

8.3.5.2 The Owner shall be entitled to claim against the Contractor for any liquidated damages incurred. The Owner cannot anticipate at this time what liquidated damages may occur or what the per diem cost of these damages might be. Determination of liquidated damage details will be a matter of proof should the issue arise.

- 8.3.5.3 The Owner shall recover said liquidated damages by deducting the amount thereof from any monies due or that may become due the Contractor. In the event the remaining balance due the Contractor is insufficient to cover the full amount of assessed damages, then the Contractor or his Surety shall pay the amount due and the Owner shall be entitled to any and all rights and remedies available to it in law or equity to recover same.

8.4 RESPONSIBILITY FOR COMPLETION

- 8.4.1 The Contractor shall furnish such manpower, materials, facilities and equipment and shall work such hours, including night shifts, overtime operations and Sundays and holidays, as may be necessary to insure the progress and completion of the Work in accordance with the accepted and currently updated progress schedule. If Work actually in place falls behind the currently updated and accepted progress schedule and it becomes apparent from the current schedule that the Work will not be completed in accordance with the Contract Time, the Contractor agrees that he will, as necessary, take some or all of the following actions at no additional cost to the Owner, as required to substantially eliminate the schedule slippage deficiency:
- 8.4.1.1 Increase manpower in such quantities and crafts as will substantially eliminate in the opinion of the Project Manager the schedule slippage deficiency;
- 8.4.1.2 Increase the number of working hours per shift, shifts per working day, working days per week, or the amount of equipment, or any combination of the foregoing sufficiently to substantially eliminate, in the opinion of the Project Manager the schedule slippage deficiency; and,
- 8.4.1.3 Reschedule activities to achieve maximum practical concurrence of accomplishment of activities.
- 8.4.2 The Project Manager may require the Contractor to submit a recovery schedule in accordance with Section 01311 of the Specifications, demonstrating his program and proposed plan to make up the slippage in scheduled progress and to ensure completion of the Work in accordance with the requirements of the Contract. If the Project Manager finds the proposed plan not acceptable, he may require the Contractor to submit a new plan. If the actions taken by the Contractor or the second plan proposed are not satisfactory, the Project Manager may require the Contractor to take any of the actions set forth in this Paragraph 8.4 without additional cost to the Owner, to make up the slippage in scheduled progress.
- 8.4.3 Failure of the Contractor to substantially comply with the requirements of this Paragraph 8.4 may be considered grounds for a determination by the Owner, pursuant to Clause 14.1, that the Contractor is failing to prosecute the Work with sufficient diligence to ensure its in accordance with the Project Milestone Dates set forth under Section 00200 hereof.

END OF ARTICLE 8

ARTICLE 9

PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

9.1.1 The Contract Sum is stated in the Owner-Contractor Agreement and, including authorized adjustments thereto, is the total amount payable by the Owner to the Contractor for the performance of the Work under the Contract Documents.

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Owner, through the Project Manager, a schedule of values allocated to the various portions of the Work, as set forth in Division 1, Section 01370 of the General Requirements entitled "Schedule of Values" and supported by such data to substantiate its accuracy as the Architect, Project Manager and the Owner may require. This schedule, unless objected to by the Architect, Owner, or Project Manager, may be used as a basis for the Contractor's Applications for Payment except as otherwise noted under Division 1, Section 01311. The Schedule of Values shall be prepared in such a manner that each major item of work and each subcontracted item of work is shown as a single item on the Application and Certificate of Payment.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 Prior to the date for each progress payment established in the Contract Documents, the Contractor, in accordance with Division 1, Section 01311 of the General Requirements entitled "Project Schedule," shall submit to the Project Manager an itemized Application for Payment, notarized if required, supported by such data substantiating the Contractor's right to payment as the Project Manager and the Architect may require, and reflecting retainage, if any, as provided elsewhere in the Contract Documents. The form of Application for Payment shall be Anchorage School District Forms 100, 100A, 100B and 100C and the computer-produced Cost Report updated in accordance with Division 1, Section 01311.

9.3.2 If the Project Manager finds that satisfactory progress is not being made, he may require retainage of up to 10% of the total amount earned on all subsequent progress payments. This retainage may be released at such time as the Project Manager finds that satisfactory progress is being made.

9.3.3 Payments may be authorized by the Project Manager at his discretion, on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site by the Contractor. Payments for materials or equipment stored on the site shall only be considered upon submission by the Contractor of satisfactory evidence that he has acquired title to such material, that it will be utilized on the Work under this Contract and that it is satisfactorily stored, protected, and insured or that other procedures satisfactory to the Project Manager that will protect the Owner's interests have been taken.

9.3.4 The Contractor warrants that title to all Work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 9 as "liens"; and that no Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing Work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise

imposed by the Contractor or such other person.

9.4 APPROVAL OF PAY APPLICATION

- 9.4.1 The Project Manager will, after receipt of the Contractor's Application for Payment, and within the time set forth in Division 1, Section 01311 of the General Requirements entitled "Project Schedule," either approve the Application for its full amount or notify the Contractor in writing of his reasons for withholding approval, in whole or in part, as provided in Subparagraph 9.6.1.
- 9.4.2 The submission and acceptance of the Contractor's Preliminary and Detailed Progress Schedules and monthly updates thereof as required by Division 1, Section 01311 of the General Requirements entitled "Project Schedule," shall be an integral part and basic element of the application upon which progress payments shall be made. If in the judgment of the Project Manager the Contractor fails or refuses to provide information required to accomplish a complete Project Schedule Update or revision thereto as specified under Division 1, Section 01311 of the General Requirements, the Contractor shall be deemed to have not provided the information necessary to enable the Project Manager and the Architect to properly evaluate the Contractor's progress, and shall not be entitled to progress payments until it has furnished the information necessary for a complete Project Schedule Update or revision thereto as specified herein to the satisfaction of the Project Manager.
- 9.4.3 The signing of an Application for Payment will constitute a representation by the Project Manager and the Architect, based on their observations at the site and the data comprising the Application for Payment, that the Work has progressed to the point indicated; that, to the best of their knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to the results of any subsequent tests required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in their Certificate); and that the Contractor is entitled to payment in the amount certified. However, by approving an Application for Payment, the Project Manager and the Architect shall not thereby be deemed to represent that either has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work or that either has reviewed the construction means, methods, techniques, sequences or procedures, or that either has made an examination to ascertain how or for what purpose the Contractor has used the monies previously paid on account of the Contract Sum.

9.5 PROGRESS PAYMENTS

- 9.5.1 After an Application for Payment has been approved, the Owner shall make payment within thirty (30) calendar days.
- 9.5.2 The Contractor shall promptly pay each Subcontractor (including suppliers, laborers, and material-men) performing labor or furnishing material for the Work, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's Work, the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractor's Work. The Contractor shall, by an appropriate agreement with each Subcontractor, also require each Subcontractor to make payments to his Sub-subcontractors in similar manner.
- 9.5.3 The Owner may, on request and at his discretion, furnish to any Subcontractor, Sub-subcontractor, or Material Supplier and Vendor, if practicable information regarding the

percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the Project Manager on account of Work done by such Subcontractor, Sub-subcontractor, or Material Supplier or Vendor.

- 9.5.4 Neither the Owner, the Project Manager, nor the Architect shall have any obligation to pay or to see to the payment of any monies to any Subcontractor except as may otherwise be required by law.
- 9.5.5 No approval for a progress payment, nor any progress payment, nor any partial or entire use of occupancy of the Project by the Owner, shall constitute an acceptance of any Work not in accordance with the Contract Documents.
- 9.5.6 The Contractor agrees to keep the Work and the site(s) on which Work is to be performed free and clear of all liens and claims of liens on materials furnished pursuant to the Contract Documents. Contractor hereby waives any right it may have in connection with the Work to file any liens, mechanics or otherwise. Notwithstanding anything to the contrary contained in the Contract Documents, if any such lien is filed or there is any reason to believe that any lien may be filed at any time during the progress of the Work or within the duration of this Contract, the Owner may refuse to make any payment otherwise due to Contractor or withhold from any payment due the Contractor a sum sufficient in the opinion of the Owner to pay all obligations and expenses necessary to satisfy such lien or claim and completely indemnify the Owner against any such lien or claim unless and until Contractor shall thereof, if any, has been satisfied, discharged and released of record or that the Contractor has caused such lien to be released or record if and as provided by law pending the resolution of any dispute between Contractor and the person filing such lien; and if such evidence is not furnished by Contractor to the Owner within a period of five (5) days after demand to do so, the Owner may discharge such indebtedness and deduct the amount required therefore, together with any and all losses, costs, damages and attorney's fees suffered or incurred by the Owner from any sum payable to Contractor under the Contract Documents. Final payment to Contractor may be withheld until the Work and the site(s) on which the Work is to be performed are free and clear of any and all liens for rights thereto arising because of Work performed or materials furnished under the Contract Documents. This Subparagraph 9.5.6 shall be specifically included in all subcontracts and purchase orders entered into by Contractor.
- 9.5.7 No reference to a claim or claims of lien or to the Owner's right to withhold payments to the Contractor or to discharge the Contractor's debts to Subcontractors, in Subparagraph 9.5.6, or elsewhere in the Contract Documents, shall be interpreted as a waiver of the Owner's right to exemption pursuant to AS 09.38.015(c) or any requirements with regard to the filing of claims of lien as set forth in AS 34.35.

9.6 PAYMENTS WITHHELD

- 9.6.1 The Architect and the Project Manager may decline to approve an Application for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in their opinion they are unable to make representations to the Owner as provided in Subparagraph 9.4.3. If the Project Manager and the Architect are unable to make representations to the Owner as provided in Subparagraph 9.4.3 and to certify payment in the amount of the Application, they will notify the Contractor as provided in Subparagraph 9.4.1.

If the Contractor, Project Manager and the Architect cannot agree on a revised amount, the Project Manager will promptly approve the Application for Payment for the amount for which he is able to make such representations to the Owner. The Project Manager may also decline to certify payment or, because of subsequently discovered evidence or

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

subsequent observations, he may nullify the whole or any part of any approval of an Application for Payment previously issued to such extent as may be necessary in his opinion to protect the Owner from loss because of:

- 9.6.1.1 Defective work not remedied,
 - 9.6.1.2 Third-party claims filed or reasonable evidence indicating probable filing of such claims,
 - 9.6.1.3 Failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment,
 - 9.6.1.4 Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum,
 - 9.6.1.5 Damage to the Owner or another contractor,
 - 9.6.1.6 Reasonable evidence that the Work will not be completed within the Contract Time,
 - 9.6.1.7 Failure or refusal of the Contractor to carry out the Work in accordance with the Contract Documents, including scheduling, project management, or coordination requirements,
 - 9.6.1.8 Liens filed for any portion of the Work, or
 - 9.6.1.9 Failure or refusal of the Contractor to fully comply with Division 1, Section 01311 of the General Requirements entitled "Schedules and Reports".
- 9.6.2 When the above grounds in Subparagraph 9.6.1 are removed, payment shall be made for amounts withheld because of them.

9.7 FAILURE OF PAYMENT

- 9.7.1 If the Owner does not pay the Contractor within seven (7) days after the date established in the Contract Documents any amount certified by the Architect and the Project Manager, then the Contractor may, upon seven (7) additional days' written notice to the Owner and the Architect, stop the Work until payment of the amount not in dispute has been received. The Contractor shall not refuse or fail to diligently proceed with the Work pending the resolution of any amount(s) in dispute unless agreed to by the Owner.

9.8 SUBSTANTIAL COMPLETION

- 9.8.1 When the Contractor considers that the Work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Subparagraph 8.1.3, the Contractor shall prepare for submission to the Project Manager a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Architect and the Project Manager on the basis of an inspection jointly determine that the Work or designated portion thereof is substantially complete, the Architect will then prepare a Certificate of Substantial Completion which shall establish the Date of Substantial Completion, shall state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, correction of punchlist items and damage to the Work, and insurance, and shall fix the time within which the Contractor shall complete the items listed therein. Warranties required by the Contract Documents shall

commence on the Date of Substantial Completion of the work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.

- 9.8.2 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Project Manager and the Architect, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof, as provided in the Contract Documents.
- 9.8.3 The acceptance of Substantial Completion payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the Application for Payment for Substantial Completion, and except for the retainage sums due at final acceptance if any.

9.9 FINAL COMPLETION AND FINAL PAYMENT

- 9.9.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect and the Project Manager will promptly make such inspection and, when they find the Work acceptable under the Contract Documents and the Contract fully performed, they will jointly issue a final Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor, as noted in said final Certificate, is due and payable. The final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Subparagraph 9.8.2 have been fulfilled.
- 9.9.2 Neither the final payment nor the remaining retained percentage shall become due until the Work is free and clear of any and all liens and the Contractor submits to the Owner (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment and (3), if required by the Project Manager, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by the Project Manager. If any Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify him against any loss. If any such lien or claim remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such lien or claim, including all costs and reasonable attorney's fees. The Owner may withhold from the final payment any sum that the Owner has reason to believe may be needed to satisfy any lien, claim or threat of lien arising from the Work. The Owner may deduct from the final payment an amount equal to any costs, expenses and attorneys' fees incurred by the Owner in removing or discharging any liens arising from the Work.
- 9.9.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor, or by the issuance of change orders affecting final completion, and the Owner so confirms, the Owner shall, upon application by the Contractor and certification by the Project Manager and the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than the retainage stipulated in the Contract Documents, and if bonds have been furnished as provided in Paragraph 7.5, the written consent of the surety to the

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Project Manager prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

- 9.9.4 The making of final payment shall constitute a waiver of all claims by the Owner against the Contractor except those arising from:
 - 9.9.4.1 Unsettled liens, and claims against the Owner, the Project Manager, or the Architect, or their employees, agents, or representatives,
 - 9.9.4.2 Faulty or defective Work appearing after Substantial Completion,
 - 9.9.4.3 Failure of the Work to comply with the requirements of the Contract Documents,
 - 9.9.4.4 Terms of any warranties contained in or required by the Contract Documents,
 - 9.9.4.5 Liquidated damages due the Owner for the Contractor's delay in completion, or
 - 9.9.4.6 Damages incurred by the Owner resulting from lawsuits brought against the Owner, the Project Manager, the Architect, or their agents, employees or representatives because of failures or actions on the part of the Contractor, his Subcontractors, Sub-subcontractors, Material Suppliers and Vendors, or any of their employees, agents or representatives.
- 9.9.5 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final Application for Payment.
- 9.9.6 Final Completion includes, but is not limited to, the Contractor obtaining an unconditional Certificate of Occupancy from the governing building official.
- 9.10 OWNER'S RIGHT TO OCCUPY INCOMPLETE WORK
 - 9.10.1 Should the Project, or any portion thereof, be incomplete for Beneficial Occupancy or Final Completion at the scheduled date or dates, the Owner shall have the right to occupy any portion of the Project. In such an event, the Contractor shall not be entitled to any extra compensation on account of said occupancy by the Owner or by the Owner's normal full use of the Project, nor shall the Contractor interfere in any way with said normal full use of the Project. Further, in such an event, the Contractor shall not be entitled to any extra compensation on account of the Owner's occupancy and use of the Project, nor shall the Contractor be relieved of any responsibilities of the Contract including the required times of completion. Such occupancy by the Owner would not, in itself, constitute Beneficial Occupancy nor Final Completion.
 - 9.10.2 If the Owner exercises his rights under the foregoing and occupies the full project, then there shall be no liquidated damages due to delay on account of failure on the Contractor's part to provide Beneficial Occupancy from that date forward. This provision does not affect, however, any damages due to delay that would be assessed for any period of time between the scheduled date of Beneficial Occupancy and the date of any such actual occupancy. Further, this provision would have no effect on actual damages assessed on account of late Final Completion.

9.11 RETENTION AND INSPECTION OF RECORDS

9.11.1 Inspection.

The Anchorage School District, or any of its duty authorized representatives, shall have the right to examine all project records and documents, including without limitation, all books, correspondence, reports, analyses, instructions drawings, receipts, vouchers, memoranda, and all financial and accounting books, records, and data and all other documents of both the Contractor and the Contractors, Subcontractors and any Sub-subcontractors which are directly pertinent to this specific Contract for the purpose of making an audit, examination, reproduction, excerpts, or transcriptions. All required records shall be retained by the Contractor and its first tier Subcontractors for three (3) years after the Owner makes final payments and all other pending matters are closed.

9.11.2 Retention and Maintenance.

The Contractor shall keep and maintain in safe condition full and accurate records of all costs incurred and items billed and all other project records and documents relating to performance, communications, and correspondence in connection with the performance of the Work under this Contract, which records and documents shall be open to review, examination or audit by the Owner or its authorized representatives during performance of the Work and until three (3) years after Final Payment and all other pending matters are closed.

9.11.3 Subcontractor Records.

The Contractor shall make it a condition of all subcontracts and sub-subcontracts relating to the Work under this Contract that any and all Subcontractors and sub-subcontractors will keep accurate records of costs incurred and items billed in connection with their work and that such records shall be open to review, examination, reproduction or audit by the Owner or its authorized representatives during performance of the Work and until three (3) years after Final Payment under the subcontract and all other pending matters are closed.

9.11.4 Availability.

The Contractor shall make available at its business office upon request at all reasonable times the materials described in this Article including materials of both the Contractor and its first tier Subcontractors, for review, examination reproduction or audit for a period of three (3) years after Final Payment under this Contract and all other pending matters are closed.

9.11.5 Termination.

If this Contract is completely or partially terminated, the records relating to the Work terminated shall be made available for three (3) years after any resulting final termination settlement.

9.11.6 Claims and Appeals.

Records pertaining to any settlement, mediation, arbitration, litigation or appeals of claim submitted pursuant to Paragraphs 12.4 or 12.5 or otherwise arising from or relating to the performance of Work under this Contract shall be made available until such settlement, mediation, arbitration, litigation, or appeals are finally concluded. Such documents or records shall be made available to the Anchorage School District or its duty authorized representatives within thirty (30) days of the Anchorage School District's request.

9.11.7 Subcontracts.

The Contractor shall include the provisions of this Article in all first tier Subcontracts so as to be binding on all first tier Subcontractors.

9.11.8 Cost or Pricing Data.

If the Contractor has submitted cost or pricing data in connection with the pricing of any change order or modification to this Contract - unless the pricing was based on—

- 9.11.8.1 adequate price competition, or
- 9.11.8.2 established catalog or market price of commercial items sold in substantial quantities to the general public; or
- 9.11.8.3 prices set by law or regulation -

the Anchorage School District or a representative who is an employee of the Anchorage School District, shall have the right to examine and audit all books, records, documents, and other data of the Contractor, including computations and projections, related to negotiating, pricing, or performing the change order or modification, in order to evaluate the accuracy, completeness, and currency of the cost or pricing data.

END OF ARTICLE 9

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Owner, the Project Manager, the Architect, or their agents, employees or representatives are not responsible for the means, methods, techniques, sequences or procedures utilized by the Contractor, or for safety precautions and programs in accordance with the Work. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

10.2.1.1 All employees on the Work and all other persons who may be affected thereby;

10.2.1.2 All the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-subcontractors; and

10.2.1.3 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.

10.2.2.1 The Contractor shall contact the State Historic Preservation Office (907-269-8700) immediately, should cultural or paleontological resources be discovered as a result of performing the Work.

10.2.3 The Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

10.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

10.2.5 The Contractor shall promptly remedy all damage or loss to any property referred to in paragraphs 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, any Subcontractor, any Sub-subcontractor, any Material Supplier or Vendor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Contractor is responsible under paragraphs 10.2.1.2 and 10.2.1.3, except damage or loss attributable to the acts or omissions of the Owner, Project Manager or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to his obligations under Paragraph 4.18.

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

- 10.2.6 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner through the Project Manager.
- 10.2.7 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.
- 10.2.8 Following the Notice to Proceed, the Contractor is required to obtain facility keys and the security system access code from ASD Operations Department and obtain the facility keys by contacting the Project Manager.
- 10.2.8.1 A unique security code will be assigned to the Contractor. The ASD Operations office, 1301 Labar, will assign the code and provide access training.
- 10.2.8.2 The Contractor's signature on the key receipt acknowledges liability for the Owner's loss or damage due to unauthorized access with the facility key(s) and/or access code issued to the Contractor. The Contractor's Superintendent is solely responsible for opening and closing of the facility.
- 10.2.8.3 Lost or stolen key(s) issued to the Contractor are to be reported immediately to the Project Manager. A written report shall be required for each incident.
- 10.2.8.4 Upon completion of the Project and prior to final payment, the Contractor will return all key(s) to the Project Manager. The following per facility charges will apply to any key not returned to the Project Manager.

<u>Facility Type</u>	<u>Charge</u>
Elementary School	\$5,000
Junior High/Middle School	\$7,000
Senior High School	\$10,000
Other ASD Facilities	\$5,000

10.3 EMERGENCIES

- 10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 8 for Time, and Article 12 for Changes in the Work.

END OF ARTICLE 10

ARTICLE 11

INSURANCE

11.1 GENERAL

11.1.1 Before signing this Contract, or commencing work on any project or allowing any Subcontractor to commence work, the Contractor shall obtain all insurance required under this section. The Contractor shall maintain this insurance until Final Acceptance. Proof of Insurance will be required prior to performing work under the warranty. The Contractor shall file with Owner as verification of insurance, an original signed certificate of insurance showing the type and amounts of insurance, the policy number, and expiration date. The Contractor shall provide copies of each insurance policy if requested by the Owner. The Contractor shall purchase insurance from companies reasonably acceptable to the Owner and authorized to do business in the State of Alaska, possessing a Best's policyholder's rating of A- or better and a financial rating of not less than VII.

11.2 WORKERS' COMPENSATION INSURANCE

11.2.1 The Contractor shall purchase and maintain during the life of this Contract, Workers' Compensation Insurance for all employees who will work on this project and if any work is sublet, the Contractor shall require the Subcontractor to provide similar Workers' Compensation Insurance for employees. Such workers' compensation insurance shall meet the statutory requirements of the State of Alaska.

11.3 PUBLIC AND EMPLOYER LIABILITY INSURANCE

11.3.1 The Contractor and his Subcontractors, if any, shall purchase and maintain such Public and Employer Liability Insurance as will protect the Contractor against loss which may result from claims for damages from operations under this Contract, whether such operations be those of the Contractor, a Subcontractor, or any person directly or indirectly employed by them. Such liability insurance shall have a scope of coverage at least as broad as the current ISO form # CG 0001 (occurrence version) for General Liability and the current ISO form # CA 0001 for Automobile Liability, and in minimum limits specified in Paragraph 11.3.2.

11.3.2 Public and Employer Liability Insurance Requirements

11.3.2.1 Commercial General Liability

Combined Single Limit \$1,000,000
Annual Aggregate \$2,000,000

11.3.2.2 Comprehensive Auto Liability

Including all owned, hired and non-owned vehicles.
Combined Single Limit \$1,000,000 each accident

11.3.2.3 Employer's Liability Insurance
\$1,000,000 limit

11.3.3 Umbrella Liability

11.3.3.1 The Contractor shall maintain an umbrella liability policy according to the following:

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

Projects < \$10 million construction cost – \$5,000,000 per occurrence and annual aggregate.

Projects > \$10 million construction cost – \$10,000,000 per occurrence and annual aggregate.

This requirement does not apply to Subcontractors.

- 11.3.3.2 Umbrella liability insurance shall be maintained in effect until final acceptance by the Owner of the completed construction, and for products liability and completed operations liability, a minimum of two years thereafter.

11.4 BUILDERS RISK INSURANCE

- 11.4.1 The Contractor shall purchase and maintain an all risk Builder's Risk policy on all construction projects. The Builders Risk coverage shall be in an amount equal to the initial contract, plus any contract modifications, and the cost of materials supplied or installed by others. Perils insured must be all physical loss and will include earthquake, flood, testing and startup, resultant damage from errors in design, plans or specifications, and transit and offsite storage.
- 11.4.2 A loss insured under Subparagraph 11.4.1 shall be adjusted by the Insurer, or by the Contractor as Fiduciary, and made payable to the Contractor as Fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Subparagraph 11.4.5. The Contractor shall pay each Subcontractor a just share of any insurance monies received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require each Subcontractor to make payments to his Sub-subcontractors in similar manner.
- 11.4.3 The Owner and Contractor shall waive all rights against each other for damages caused by fire or other perils to the extent covered by insurance obtained pursuant to this Paragraph 11.4 or any other property insurance applicable to the Work, except such rights as they may have to the proceeds of such insurance held by the Contractor as Fiduciary. The Contractor shall require, by appropriate agreement, written where legally required for validity, similar waivers in favor of the Owner and the Contractor by Subcontractors and Sub-subcontractors. With respect to the waiver of rights of recovery, the term Owner shall be deemed to include, to the extent covered by property insurance applicable thereto, his consultants, employees, agents and representatives, including the Project Manager. The Contractor waives as against any separate Contractor described in Article 6 all rights for damages caused by fire or other perils in the same manner as is provided above as against the Owner. The Owner shall require, by appropriate agreement, written where legally required for validity, similar waivers in favor of the Contractor by any separate Contractor and his Subcontractors and Sub-subcontractors.
- 11.4.4 If required in writing by any party in interest, the Contractor as Fiduciary shall, upon the occurrence of an insured loss, give bond for the proper performance of his duties. He shall deposit in a separate account any money so received, and he shall distribute it in accordance with a court order or award. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate Change Order.
- 11.4.5 The Contractor as Fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within five (5) days after the occurrence of loss to the Owner's exercise of this power, and if such objection is made, the matter shall be decided by a court of competent jurisdiction or as parties in interest

otherwise agree. The Contractor as Fiduciary shall, in that case, make settlement with the insurers accordingly.

11.4.6 If the Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion thereof, such occupancy shall not commence prior to a time mutually agreed to by the Owner and Contractor and to which the insurance company or companies providing the property insurance have consented by endorsement of the policy or policies. This insurance shall not be canceled or lapsed on account of such partial occupancy. Consent of the Contractor and of the insurance company or companies to such occupancy or use shall not be unreasonably withheld.

11.5 CERTIFICATE OF INSURANCE REQUIREMENTS

11.5.1 Each insurance policy required in this section will be evidenced by a certificate of insurance which contains the following:

11.5.1.1 Notice of cancellation to the Anchorage School District in accordance with Alaska Statutes 21.36.220 and .260.

11.5.1.2 Contract number.

11.5.1.3 Project location.

11.5.1.4 Waiver of Subrogation. All policies, except where prohibited, will include a Waiver of Subrogation in favor of the District.

11.5.1.5 Additional Insured. All policies except Workers Compensation and professional liability will note the District as an additional insured.

11.6 OWNER'S RIGHT TO INSURE

11.6.1 In the event Contractor neglects, refuses, or fails to provide the insurance required under the Contract Documents, or if such insurance is canceled for any reason, the Owner shall have the right, but not the duty to procure the same, and the costs thereof shall be deducted from monies then due or thereafter to become due the Contractor.

11.7 ADDITIONAL INSURANCE

11.7.1 If not covered by the above insurance, the Contractor must obtain additional Insurance for items stored off-site or in transit. Payments for materials stored off-site will not be made unless Contractor provides documentation of valid insurance coverage for same.

11.8 ASBESTOS ABATEMENT SUBCONTRACTOR'S CERTIFICATE OF INSURANCE

11.8.1 After the Intent to Award Notification, the low bidder shall submit an insurance binder of insurance certificate provided by the proposed asbestos abatement subcontractor's insurance company stating that upon execution of the Contract the types and amount of insurance required elsewhere in these specifications will immediately become effective.

The asbestos abatement subcontractor is required to carry a minimum of \$1,000,000 of General Public Liability Insurance with no exclusion for asbestos abatement.

11.8.2 Comprehensive General Liability Minimum Limits

Bodily Injury and Property Damage \$2,000,000 per occurrence

Premises Operations
Independent Contractors
Products - Completed Operations
Contractual Liability
Broad Form Property Damage - Lloyds Form
Explosion, Collapse, and Underground
Personal Injury

11.8.3 Comprehensive Auto Liability

Including all owned, hired, and non-owned vehicles
Combined single limit per accident \$1,000,000

END OF ARTICLE 11

ARTICLE 12

CHANGES IN THE WORK AND CONTRACT SUM AND TIME

12.1 CHANGES IN THE WORK

12.1.1 The Owner may, at any time, without notice to the sureties, make any change in the Work within the general scope of the Contract, including, but not limited to changes:

12.1.1.1 In the Specifications or Drawings;

12.1.1.2 In the method or manner of performance of the Work;

12.1.1.3 In the Owner-furnished facilities, equipment, materials, services or site; or

12.1.1.4 Directing acceleration in the performance of the Work for reasons other than delays caused by the Contractor.

12.1.2 All such changes in the Work shall be performed under the applicable conditions of the Contract Documents and shall be authorized in one of the following manners:

12.1.2.1 Field Directive. The Project Manager may issue a written Field Directive to the Contractor that directs a change in the Work. If the Contractor believes that the requested change will increase the Contract Time or Contract Sum, he must notify the Project Manager in writing prior to implementing the change.

12.1.2.2 Information Bulletin. The Architect may issue an Information Bulletin to the Contractor that clarifies or modifies the plans or specifications. If the Contractor believes that the clarification or modification of plans or specifications will increase the Contract Time or Contract Sum, he must notify the Project Manager in writing prior to implementing the change.

12.1.2.3 Request for Information (RFI). The Contractor may submit a RFI to the Project Manager or Architect using the ASD Procore Construction Management Program to request clarification of plans or specifications or to point out areas of apparent conflict or other concerns relating to the Work. The response to the RFI by the Architect or Project Manager may clarify or modify the plans or specifications. If the Contractor believes that the clarification or modification of plans or specifications will increase the Contract Time or Contract Sum, he must notify the Project Manager in writing prior to implementing the change.

12.1.2.4 Request for Proposal (RFP). The Owner may issue an RFP to the Contractor that directs a change in the Work and requests the Contractor's evaluation of the impact of the change on Contract Time or Contract Sum. If the Contractor believes that the Work required by the RFP will increase the Contract Time or Contract Sum, he must notify the Project Manager in writing prior to implementing the changes.

12.1.3 Except as provided in Subparagraph 12.1.2, no order, statement or conduct of the Owner, Project Manager or Architect shall be treated as a change or entitle the Contractor to an equitable adjustment hereunder. No oral agreement of any kind shall be construed as a Change Order.

12.2 AMENDING CONTRACT SUM OR TIME

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

- 12.2.1 If any change under Paragraph 12.1 causes an increase or decrease in the Contractor's cost or the time required for the performance of any part of the Work under the Contract, including Work not affected directly by the change, an equitable adjustment shall be processed and approved following the provisions of Division 1, Section 01311, Project Schedule for any adjustment to time. Adjustments to Contract Sum shall be determined in one or more of the following ways:
- 12.2.1.1 By mutual acceptance of a lump sum price properly itemized in accordance with Subparagraph 12.2.2 and supported by sufficient data to permit evaluation;
 - 12.2.1.2 In the event that unit prices are included in the bid and accepted by the Owner, payment for the Work performed shall be at the unit price amount for each item of Work accepted by the Owner and conforming to the contract requirements. Such prices shall be additive and deductive and include all costs necessary to complete the Work, inclusive of overhead costs and profit.
 - 12.2.1.3 If prior to the commencement of the Work the Contractor has not provided a lump sum price, or the Contractor and the Owner have not agreed on a lump sum price as described in Subparagraph 12.2.1.1 above, the price shall be established in one of the following ways, as determined by the Project Manager;
 - 1. on a lump sum basis following completion of the Work. The lump sum price shall be properly itemized in accordance with Subparagraph 12.2.2. and supported by sufficient data to permit evaluation;
 - 2. on a time and materials basis, with or without a maximum not-to-exceed price, at the discretion of the Project Manager. Costs will be accumulated on a time and materials basis as described in Subparagraph 12.2.3 and presented daily (the day after the Work is performed) for approval by the Owner on the forms provided by the Owner. The daily report will be signed by the Contractor and the Owner.
- 12.2.2 For Work proceeding on a lump sum basis. In accordance with Subparagraph 12.2.1.1 or 12.2.1.3.1, the Contractor shall provide a detailed breakdown of the costs as described herein and submit the costs and substantiating data in a proposal to the Owner:
- 12.2.2.1 Direct Costs: Direct costs shall be limited to the following: cost of materials, including sales tax and cost of delivery to the project; cost of labor (from apprentice level up through and including the general foreman classification) comprising of the base wage plus fringe benefits, including burden (Social Security, Worker's Compensation, and Unemployment Insurance, etc.); rental rate including fuel and maintenance for any power tools valued at over \$3,000 and equipment as described below, under "Equipment Rates;" bond premiums and additional cost of Builder's Risk Insurance, at rates equal to the amount billed for the base contract or the actual rate as supported by an invoice.
 - 12.2.2.1.1 Equipment Rates: For any machinery or special equipment (other than small tools) which has been authorized by the Project Manager, the Contractor shall receive the rental rates in the current edition and appropriate volume of the "Rental Rate Blue Book for Construction Equipment," published by K-III Directory Corp., 10 Lake Drive, Highstown, NJ 08520-5397.

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

Hourly rental rates shall be determined as follows. The established hourly rental rate shall be equal to the adjusted monthly rate for the basic equipment plus the adjusted monthly rate for applicable attachments, both divided by 176, and multiplied by the area adjustment factor, plus the estimated hourly operating costs. The adjusted monthly rate is that resulting from application of the rate adjustment formula in order to eliminate replacement cost allowances in machine depreciation and contingency cost allowances. Attachments shall not be included unless required for the time and materials Work. For equipment not listed in the Blue Book, the Contractor shall receive a rental rate as agreed upon before such Work is begun. If agreement cannot be reached, the Owner reserves the right to establish a rate based on similar equipment in the Blue Book or prevailing commercial rates in the area. These rates shall apply for equipment used during the Contractor's regular shift of 10 hours per day. Where the equipment is used more than 10 hours per day, either on the Contractor's normal Work or on time and materials, and either on single or multiple shifts, an overtime rate, computed as follows, shall apply: The hourly overtime rate shall be equal to the adjusted monthly rate for the basic equipment plus the adjusted monthly rate for applicable attachments, both divided by 352, and multiplied by the area adjustment factor, plus the estimated hourly operating cost.

12.2.2.1.2 Equipment which must be rented or leased specifically for Work required under this section shall be authorized in writing by the Project Manager.

12.2.2.1.3 When it is necessary to obtain equipment from sources beyond the project limits exclusively for time and materials Work, the actual cost of transferring the equipment to the site of the Work and return will be allowed as an additional item of expense. Where the move is made by common carrier, the move-in allowance will be limited to the amount of the freight bill or invoice. If the Contractor hauls the equipment with his own forces, the allowance will be limited to the rental rate for the hauling unit plus operator wages. In the event that the equipment is transferred under its own power, the moving allowance will be limited to one-half of the normal hourly rental rate plus operator's wages. In the event that the move-out is to a different location, payment will in no instance exceed the amount of the move-in. Move-in allowance shall not be made for equipment brought to the project for time and materials Work which is subsequently retained on the project and utilized for completion of contract items, camp maintenance, or related Work.

12.2.2.1.4 Equipment ordered to be on stand-by basis shall be paid for at the stand-by rental rate for the number of hours in the Contractor's normal Work shift, but not to exceed 8 hours per day. The stand-by rental rate shall be computed as follows:

The hourly stand-by rate shall be equal to the adjusted monthly rate for the basic equipment plus the adjusted monthly rate for applicable attachments, both divided by 352, all multiplied by the

area adjustment factor.

Time will be recorded to the nearest one-half hour for purposes of computing compensation to the Contractor for equipment utilized under these rates.

The equipment Direct Cost determination covers all costs for providing required equipment and no additional compensation will be made for other costs such as, but not limited to, fuels, lubricants, replacement parts or maintenance costs. Cost of repairs, both major and minor as well as charges for mechanic's time utilized in servicing equipment to ready it for use prior to moving to the project and similar charges will not be allowed.

12.2.2.2 Overhead: Overhead shall include the following: the Contractor's management staff; supervision; superintendence; wages of timekeepers; watchmen and clerks; small tools; incidentals; costs of preparing and responding to Request for Proposals, including estimating; schedule revisions, software costs and clerical expenses; general home and field office expenses; including any financial/financing costs; legal costs; and/or accounting costs; temporary facilities; temporary utilities (power, water, sewer, telephone, etc.) And any utilities used by the Contractor during the construction period; and all other expenses not specifically defined in Subparagraph 12.2.2.1 as direct costs. Unless specifically required or requested, any travel and associated costs from outside of the Municipality of Anchorage is considered as part of the Contractor's project overhead and will not be paid by the Owner.

12.2.2.3 The Contractor shall apply a combined percentage rate to the direct costs to compensate it for additional Overhead and Profit associated with the change. The combined rate to the Owner of any change shall not exceed the rates set forth in the following schedule:

For the Contractor, for Work performed by his own forces, up to fifteen percent (15%) of direct costs;

For each Subcontractor involved, for Work performed by the Subcontractor's forces, up to fifteen percent (15%) of direct costs;

For the Contractor, for Work performed by Subcontractors, up to ten percent (10%) of the Subcontractor's direct costs;

For the Subcontractor, for Work performed by the multiple-tier-contractors up to ten percent (10%) of direct costs;

The total Contractor and all-subcontractors overhead allowance shall not exceed twenty-five percent (25%) of direct costs.

12.2.3 For Work proceeding on a time and material basis in accordance with Subparagraph 12.2.1.3.2, the Contractor shall be compensated for its costs in accordance with the following:

12.2.3.1 Direct Costs: Direct Costs shall be as defined in Subparagraph 12.2.2.1.

12.2.3.2 Overhead: Overhead shall be as defined in Subparagraph 12.2.2.2.

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

- 12.2.3.3 Overhead and Profit combined included in the total costs to the Owner of any change shall not exceed the rates set forth in the following schedule:

For the Contractor, for Work performed by his own forces, up to ten percent (10%) of direct costs;

For each Subcontractor involved, for Work performed by the Subcontractor's forces, up to ten percent (10%) of direct costs;

For the Contractor, for Work performed by Subcontractors, up to five percent (5%) of the Subcontractor's direct cost.

For the Subcontractor, for Work performed by multiple-tier-contractors up to five percent (5%) of direct costs;

The total Contractor and multiple-tier-contractor overhead allowances shall not exceed twenty percent (20%) of direct costs.

- 12.2.4 If the net value of a change results in a credit from the Contractor, Subcontractor, or Material Suppliers or Vendors, the credit given shall be the net cost without overhead or profit. The costs as used herein shall include all items of labor, materials, plant and equipment. Credit changes shall include a percentage of the direct costs for overhead and profit at fifty percent (50%) of the rates defined in Subparagraph 12.2.2.3.
- 12.2.5 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if the quantities originally contemplated are so changed in the proposed Change Order that application of the agreed unit prices to the quantities of Work proposed will cause substantial inequity to the Owner or the Contractor, the applicable unit prices shall be equitably adjusted.
- 12.2.6 The Contract Sum, the Contract Time, and the date required for performance of any part of the Work may be changed only by a Change Order to the Contract. Each Change Order will be identified at the bottom of each approved RFP, with a heading of "Change Order Authorization." Change Orders executed pursuant to this article constitute full and final settlement of all aspects of cost and time related to and/or occasioned by the Work (or event) described therein. Costs are defined to include all direct labor costs; all direct materials and equipment expenses; any and all overhead, profit, and commission; any and all impact costs related to and/or occasioned by the Work described herein; as well as all taxes and insurance. All Change Orders shall be approved by the Project Manager and signed by the Owner and Contractor.
- 12.2.7 For accounting purposes, the Change Orders identified in Subparagraph 12.2.6 will be accumulated on a monthly basis or more frequently and summarized in a Summary Change Order. The Summary Change Order shall be approved by the Project Manager and signed by the Owner and Contractor. No claim by the Contractor for or on account of any Change Order shall be due nor shall any such claim appear on an Application for Payment or demand for final payment until the Summary Change Order has been fully executed by the Contractor and the Owner.
- 12.2.8 The Superintendent of Schools and/or the Senior Director of Capital Planning and Construction are authorized to make contract modifications or to execute orders up to one hundred thousand dollars (\$100,000) that are within the project's budget. The Superintendent is authorized to make contract modifications in excess of one hundred thousand dollars (\$100,000) but not-to-exceed two hundred fifty thousand dollars (\$250,000) that are within the project's budget. All contract modifications or change orders

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

above two hundred fifty thousand dollars (\$250,000) shall be recommended by the Superintendent to the School Board for its approval.

12.2.9 No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment or more than six months after the date of substantial completion, whichever is earlier.

12.2.10 Nothing in this Article shall excuse the Contractor from proceeding with the Contract as changed.

12.3 DIFFERING CONDITIONS

12.3.1 The Contractor shall promptly, and before the conditions are disturbed, give written notice to the Owner of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this Contract, or (2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract.

12.3.2 The Owner shall investigate the site conditions promptly after receiving notice. Work shall not proceed at the affected site, except at the Contractor's risk, until the Owner has provided written instructions to the Contractor. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the Work under this Contract, whether or not changed as a result of the conditions, an adjustment shall be made under this Article and the Contract modified in writing accordingly.

12.3.3 No request by the Contractor for an adjustment to the Contract under this Article shall be allowed unless the Contractor has given the written notice required.

12.3.4 No claim by the Contractor for an adjustment hereunder shall be allowed if asserted after final payment or more than six months after the date of substantial completion, whichever is earlier.

12.4 CLAIMS FOR ADDITIONAL COST OR TIME

12.4.1 If the Contractor claims that additional cost is involved because of, but not limited to (1) any written interpretation pursuant to Subparagraph 2.2.8; (2) any order by the Owner to stop the Work pursuant to Paragraph 3.4 where the Contractor was not at fault; or (3) any other impacts related to the Work, the Contractor shall make such claim as provided in Subparagraph 12.4.2.

12.4.2 If the Contractor wishes to make a claim for an increase in the Contract Sum, and such claim is not barred under Paragraph 8.3, he shall deliver to the Project Manager written notice thereof within fourteen (14) days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Paragraph 10.3. No such claim shall be valid unless so made. The written notice shall state:

12.4.2.1 the date, nature and circumstances of the conduct regarded as a change;

12.4.2.2 the name, function and activity of each Contractor official, agent or employee involved in or knowledgeable about such conduct;

12.4.2.3 the identification of any documents and the substance of any communication

involved in such conduct;

- 12.4.2.4 in the instance of alleged acceleration of scheduled performance or delivery, the basis upon which it arose;
- 12.4.2.5 the particular elements of Contract performance for which the Contractor may seek an equitable adjustment under this Paragraph, including:
 - 12.4.2.5.1 what Contract Drawings or Specification have been or may be affected by the alleged change;
 - 12.4.2.5.2 what labor or materials or both have been or may be added, deleted or wasted by the alleged change;
 - 12.4.2.5.3 to the extent practicable, what delay and disruption in the manner and sequence of performance and effect on continued performances have been or may be caused by the alleged change in accordance with Division 1, Section 01311, "Project Schedule;"
 - 12.4.2.5.4 what adjustments to the Contract Sum and other provisions of the Contract affected by the alleged change are estimated; and
- 12.4.2.6 the Contractor's estimate of the time by which the Project Manager and Architect must respond to the Contractor's notice to minimize cost, delay or disruption of performance in accordance with Division 1, Section 01311, "Project Schedule."

12.4.3. After receipt of a Contractor's claim, the Project Manager may visit the site, schedule an informal review hearing, or request additional information in order to fully evaluate the issues of the claim. The Project Manager has thirty (30) calendar days to review the claim and to send a written decision to the Contractor. If the Project Manager agrees with the Contractor that the issues presented in the Contractor's claim justify a change in the Contract Sum or the Contract Time, the Project Manager and the Contractor shall negotiate the amount of the adjustment in the Contract.

If the Project Manager determines that the claim does not justify a change in the Contract Sum or Contract Time, or if the Project Manager cannot reach agreement with the Contractor on the amount of the adjustment in the Contract Sum or Contract Time, the amount shall be determined in accordance with Paragraph 12.5

12.4.4 In no event shall the Contractor slow or stop the Work while such determination is pending and the Owner shall continue to make payment in accordance with the Contract Documents except as to the amount in dispute. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order.

12.5 RESOLUTION OF DISPUTED CLAIMS

12.5.1 All disputed claims arising from this contract shall be resolved according to the process identified in this section 12.5. This includes any interpretations of the contract documents, claims for increase in the Contract Sum or Contract Time, or any other issues of equitable adjustment.

12.5.2 Disputes between the Owner and the Contractor will be processed through the appeal process described in 12.5.3 and/or through the use of Alternative Dispute Resolution (ADR) procedures described in 12.5.4.

12.5.3 Appeal Process

12.5.3.1 If the Contractor does not agree with the decision of the Project Manager, the Contractor may, within ten (10) calendar days of receipt of the decision, file a notice of appeal with the Chief Operating Officer. The Chief Operating Officer will then have sixty (60) calendar days to review the appeal and send a written decision to the Contractor.

12.5.3.2 If the Contractor does not agree with the final decision rendered by the Chief Operating Officer, it may pursue litigation.

12.5.4 ADR Process

12.5.4.1 Either the Owner or the Contractor may request, prior to litigation, that a dispute be submitted to mandatory mediation.

12.5.4.2 The parties shall jointly select and compensate a third party mediator.

12.5.4.3 Both parties shall attend joint mediation sessions and make a good faith effort to reach agreement through this process.

12.5.4.4 There is no obligation for either of the parties to accept any agreement during the mediation process.

12.5.5 The Contractor shall diligently carry on the Work and maintain the progress schedule during any dispute resolution proceedings, unless otherwise agreed in writing.

END OF ARTICLE 12

ARTICLE 13

UNCOVERING AND CORRECTION OF WORK

13.1 UNCOVERING OF WORK

13.1.1 If any portion of the Work should be covered contrary to the request of the Owner, Project Manager or the Architect or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Project Manager, be uncovered for his observation and shall be replaced at the Contractor's expense.

13.1.2 If any other portion of the Work has been covered which the Architect or the Project Manager has not specifically requested to observe prior to being covered, either may request to see such Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it be found that this condition was caused by the Owner or a separate contractor as provided in Article 6, in which event the Owner shall be responsible for the payment of such costs.

13.2 CORRECTION OF WORK

13.2.1 The Contractor shall promptly correct all Work rejected by the Project Manager as defective or as failing to conform to the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including additional Owner Administrative and legal expenses, and additional compensation for the Architect's and/or Project Manager's additional services made necessary thereby.

13.2.2 If, within one (1) year after the Date of Substantial Completion of the Work or designated portion thereof or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner through the Project Manager to do so unless the Owner through the Project Manager has previously given the Contractor a written acceptance of such condition. This obligation shall survive the provisions of Subparagraph 9.5.5 and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

13.2.3 The Contractor, unless removal is waived by the Owner, shall remove from the site all portions of the Work which are defective or non-conforming, or if permitted or required, he shall correct such Work in place by and at the expense of the Contractor promptly after receipt of notice, and such rejected Work shall not thereafter be tendered for acceptance unless the former rejection or requirement for correction is disclosed.

13.2.4 If the Contractor does not proceed with the correction of such defective or non-conforming Work within a reasonable time fixed by written notice from the Owner, through the Project Manager, the Owner may either:

13.2.4.1 by separate contract or otherwise replace or correct such Work and charge the Contractor the cost occasioned the Owner thereby and remove and store the materials or equipment at the expense of the Contractor, or

13.2.4.2 terminate this Contract for default as provided in Paragraph 14.1. If the Contractor does not pay the cost of such replacement or correction and the

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

removal and storage within ten (10) days thereafter, the Owner may upon ten (10) additional days' written notice sell such Work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for the Owner's administrative and legal expenses, and additional services of the Architect and the Project Manager made necessary thereby. If such proceeds of sale do not cover all costs which the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

13.2.5 The Contractor shall bear the cost of making good all Work of the Owner or separate contractors destroyed or damaged by such correction or removal.

13.2.6 Nothing contained in this Paragraph 13.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Paragraph 4.5. thereof. The establishment of the time period of one (1) year after the date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which his obligation to comply with the Contract documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to his obligations other than specifically to correct the Work.

13.3 ACCEPTANCE OF DEFECTIVE OR NONCONFORMING WORK

13.3.1 If the Owner prefers to accept defective or nonconforming Work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable, or the Owner may elect to accept payment in materials or services, in lieu of a reduction in the Contract Sum. If the amount of a reduction is determined after final payment, it shall be paid to the Owner directly by the Contractor.

END OF ARTICLE 13

ARTICLE 14

TERMINATION OF THE CONTRACT

14.1 TERMINATION BY THE OWNER

14.1.1 If the Contractor:

- 14.1.1.1 is adjudged bankrupt; or
- 14.1.1.2 makes a general assignment for the benefit of his creditors; or
- 14.1.1.3 has a receiver appointed on account of his insolvency; or
- 14.1.1.4 if he refuses or fails to commence the Work within the time required by this Contract; or
- 14.1.1.5 refuses or fails to prosecute the Work or any separable part with the diligence that will ensure its completion within the time specified in this Contract, including any extension; or
- 14.1.1.6 refuses or fails to provide sufficient and properly skilled workmen or proper materials or equipment to complete the Work in an acceptable manner and without delay; or
- 14.1.1.7 refuses or fails to complete the Work in accordance with the Project Schedule Milestone Dates set forth under Section 00200 hereof; or
- 14.1.1.8 fails to make prompt payment to Subcontractors or for materials or labor, or
- 14.1.1.9 persistently disregards laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction; or
- 14.1.1.10 fails or refuses to comply with the requirements of Division 1, Section 01311, "Project Schedule" of the Contract Documents; or
- 14.1.1.11 otherwise is guilty of a substantial violation of a provision of the Contract Documents,

then the Owner, may, without prejudice to any right or remedy and after giving the Contractor and his surety, if any, seven (7) days' written notice, terminate the employment of the Contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished. Such an event of termination shall at the option of the Owner result in the automatic assignment to the Owner of all of the Contractor's subcontracts, and the Owner may thereafter enforce such subcontracts in the prosecution of the Work in the same manner and to the same extent as the Contractor.

- 14.1.2 If the cost of finishing the Work exceeds the unpaid portion of the Contract Sum, the Contractor or his assigns, heirs or sureties shall pay the difference to the Owner. This obligation shall survive the termination of the Contract.

14.1.3 Nothing contained in this Article 14 shall impair any of the obligations of the surety.

14.2 TERMINATION FOR CONVENIENCE

14.2.1 The performance of the Work under this Contract may be terminated by the Owner in whole, or from time to time in part, whenever the Owner shall determine that such termination is in the best interest of the Owner. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of Work under the Contract is terminated, and the date upon which such termination becomes effective.

14.2.2 After receipt of a Notice of Termination, and except as otherwise directed by the Owner, the Contractor shall:

14.2.2.1 stop Work under the Contract on the date and to the extent specified in the Notice of Termination;

14.2.2.2 place no further orders or subcontracts for materials, services or equipment, except as may be necessary for completion of such portion of this Work under the Contract as is not terminated;

14.2.2.3 terminate all orders and subcontractors to the extent that they relate to the performance of Work terminated by the Notice of Termination;

14.2.2.4 assign to the Owner, in the manner, at the times, and to the extent directed by the Owner, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the Owner shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

14.2.2.5 settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Owner, to the extent he may require, which approval of ratification shall be final for all the purposes of this clause;

14.2.2.6 transfer title and deliver to the Owner, in the manner, at the times, and to the extent, if any, directed by the Owner, (A) the fabricated or unfabricated parts, Work in process, completed Work, supplies, and other material produced as a part of, or acquired in connection with the performance of, the Work terminated by the Notice of Termination, and (B) the completed or partially completed plans, drawings, information, and the property which, if the Contract has been completed, would have been required to be furnished to the Owner;

14.2.2.7 use his best efforts to sell, in the manner, at the time, to the extent and at the price or prices directed or authorized by the Owner, any property of the types referred to in Subparagraph 14.2.2.6 above, provided, however, that the Contractor (A) shall not be required to extend credit to any purchase, and (B) may acquire any such property under the conditions prescribed by and at a price or prices approved by the Owner, and provided further, that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Owner to the Contractor under this Contract or shall otherwise be credited to the price or cost of the Work covered by this Contract or paid in such other manner as the Owner may direct;

14.2.2.8 complete performance of such part of the Work as shall not have been

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

terminated by the Notice of Termination and may incur obligations as are necessary to do so; and

- 14.2.2.9 take such action as may be necessary, or as the Owner may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the Owner has or may acquire an interest.
- 14.2.3 The Contractor may submit to the Owner a list, certified as to quantity and quality, of any or all items of termination inventory not previously disposed of, exclusive of items the disposition of which has been directed or authorized by the Owner, and may request the Owner to remove such items or enter into a storage agreement covering them. Not later than fifteen (15) days thereafter, the Owner will accept title to such items and remove them or enter into a storage agreement covering the same; provided that the list submitted shall be subject to verification by the Owner upon removal of all items, or if the items are stored within forty-five (45) days from the date of submission of the list, and any necessary adjustment to correct the list as submitted shall be made prior to final settlement.
- 14.2.4 After receipt of a Notice of Termination, the Contractor shall submit to the Owner his termination claim, in the form and with certification prescribed by the Owner. Such claim shall be submitted promptly but in no event later than six (6) months from the effective date of termination. Upon failure of the Contractor to submit his termination claim within the time allowed, the Owner may determine on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.
- 14.2.5 Subject to the provisions of Subparagraph 14.2.4 above, the Contractor and the Owner may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or partial termination of Work pursuant to this paragraph, which amount or amounts may include a reasonable allowance of profit on Work done; provided that such agreed amount or amounts, exclusive of settlement costs, shall not exceed the total Contract Sum as reduced by the amount of payments otherwise made and as further reduced by the Contract Sum attributable to that portion of Work not terminated. The Contract shall be amended accordingly, and the Contractor shall be paid the agreed amount. Nothing in Subparagraph 14.2.6 below, prescribing the amount to be paid to the Contractor in the event of failure of the Contractor and the Owner to agree upon the whole amount to be paid to the Contractor by reason of the termination of Work pursuant to this clause, shall be deemed to limit, restrict, or otherwise determine or affect the amount or amounts which may be agreed upon to be paid to the Contractor pursuant to this Subparagraph 14.2.5.
- 14.2.6 In the event of the failure of the Contractor and the Owner to agree, as provided in Subparagraph 14.2.5 above, upon the whole amount to be paid to the Contractor by reason of the termination of Work pursuant to this paragraph, the Owner shall pay to the Contractor the amounts determined by the Owner as follows, but without duplication of any amounts agreed upon in accordance with Subparagraph 14.2.5:
 - 14.2.6.1 with respect to all Contract Work performed prior to the effective date of the Notice of Termination, the total (without duplication of any items) of:
 - 14.2.6.1.1 the cost of such Work;
 - 14.2.6.1.2 the cost of settling and paying claims arising out of the termination of Work under subcontracts or orders as provided in Subparagraph 14.2.2.5 above exclusive of the amounts paid or

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

payable on account of supplies or materials delivered or services furnished by the Subcontractor prior to the effective date of the Notice of Termination Work under this Contract, which amounts shall be included in the cost on account of which payment is made under Subparagraph 14.2.6.1 above; and

- 14.2.6.1.3 a sum as profit on Subparagraph 14.2.6.1.1 above, determined by the Owner to be fair and reasonable; and
- 14.2.6.2 the reasonable cost incidental to termination of Work including:
 - 14.2.6.2.1 accounting, legal, clerical and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data;
 - 14.2.6.2.2 the termination and settlement of subcontracts (excluding the amounts of such settlements); and storage, transportation and other costs incurred (pursuant to Subparagraph 14.2.2.9), reasonably necessary for the preservation, protection or disposition of the termination inventory.
- 14.2.6.3 The total sum to be paid to the Contractor under Subparagraph 14.2.6.1 above shall not exceed the total Contract Sum as reduced by the portion of the Contract Sum attributable to that portion of Work not terminated. Except for normal spoilage, and except to the extent that the Owner shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor under Subparagraph 14.2.6.1, the fair value, as determined by the Owner, of property which is destroyed or lost, stolen, or damaged so as to become undeliverable to the Owner, or to a buyer pursuant to Subparagraph 14.2.2.7.
- 14.2.7 In arriving at the amount due the Contractor under this paragraph, there shall be deducted (1) all unliquidated advance or other payments on account theretofore made to the Contractor, applicable to the terminated portion of this Contract, (2) any claim which the Owner may have against the Contractor in connection with this Contract, and (3) the agreed price for, or the proceeds of sale of, any materials, supplies or other things acquired by the Contractor or sold, pursuant to the provisions of this paragraph and not otherwise recovered by or credited to the Owner.
- 14.2.8 If the termination hereunder be partial, the Contractor may file with the Owner a claim for an equitable adjustment of the price or prices specified in the Contract relating to the continued portion of the Contract (the portion not terminated by the Notice of Termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices. Any claim by the Contractor for an equitable adjustment under this clause must be asserted within ninety (90) days from the effective date of the termination.
- 14.2.9 The Owner may from time to time, under such terms and conditions as it may prescribe, make partial payments and payments on account against costs incurred by the Contractor in connection with the terminated portion of this Contract whenever in the opinion of the Owner the aggregate of such payments shall be within the amount to which the Contractor will be entitled hereunder. If the total of such payments is in excess of the amount finally agreed or determined to be due under this paragraph, such excess shall be payable by the Contractor to the Owner upon demand, together with interest computed at the legal prevailing rate, for the period from the date such excess payment is received by the Contractor to the date on which such excess is repaid to the Owner, provided, however,

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00700

that no interest shall be charged with respect to any such excess payment, attributable to a reduction in the Contractor's claim by reason of retention or other disposition of termination inventory until ten (10) days after the date of such retention or disposition, or such later date as determined by the Owner by reason of the circumstances.

- 14.2.10 Unless otherwise provided for in this Contract, or by applicable statute, the Contractor shall - from the effective date of termination until the expiration of three (3) years after final settlement under this Contract - preserve and make available to the Owner at all reasonable times at the office of the Contractor but without direct charge to the Owner, all his books, records, documents and other evidence bearing on the costs and expenses of the Contractor under this Contract and relating to the Work terminated hereunder, or, to the extent approved by the Project Manager, photographs, microphotographs, or other authentic reproductions thereof.

END OF ARTICLE 14

END OF SECTION

SUPPLEMENTARY GENERAL CONDITIONS TO THE CONTRACT FOR CONSTRUCTION

REFERENCE:

1. **GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ANCHORAGE SCHOOL DISTRICT, ANCHORAGE, ALASKA**, constitutes the General Conditions of this Contract, and is further revised and supplemented by the provisions of these Supplementary General Conditions. The General Conditions and the Supplementary General Conditions are applicable to all of the work under this Contract and shall apply to the Contractor and all Subcontractors, Sub-subcontractors, and Material Suppliers and Vendors.

SUPPLEMENTS:

1. The following supplements modify, change, delete, or add to the General Conditions. Where any article of the General Conditions is modified or any paragraph deleted, subparagraph or clause thereof is modified, or deleted by these supplements, the unaltered provisions of such article, paragraph, sub-paragraph or clause shall remain in effect.

ARTICLE 4

Add the following new Paragraphs 4.7.1.2 & 4.7.1.3

- 4.7.1.2 Unless otherwise authorized by the Project Manager, successfully obtaining the necessary permits shall be the responsibility of the Contractor and shall constitute a requirement for the issuance of the Notice to Proceed by the Owner.
- 4.7.1.3 Contractor shall submit Fire Alarm shop drawings to the Municipality of Anchorage Building Safety Office.
 - 4.7.1.3.1 Contractor shall pay for the Municipality of Anchorage Fire Alarm permits.
 - 4.7.1.3.2 Contractor shall obtain the permits upon approval.

Add the following new Paragraph 4.21, Construction Management Software:

4.21 CONSTRUCTION MANAGEMENT SOFTWARE

- 4.21.1 The Contractor shall fully utilize the Owner provided construction management software, currently Sage Procore Construction Management for communications, Submittals, Requests for Information, for submission of construction record documents and photographs, and other purposes as directed by the Project Manager.
- 4.21.2 The contractor shall designate a minimum of two (2) people from their internal project staff to access the Construction Management Software. It is incumbent upon the Contractor to ensure these individuals familiarize themselves and become proficient in the use of the Construction Management software utilizing the manuals, help files, training videos, forums and other support services provided by the Construction Management Software.

ARTICLE 7

Add the following new Paragraph 7.12, Fire Alarm System:

7.12 FIRE ALARM SYSTEM

7.12.1 Before beginning any work that may result in a fire alarm transmission, the contractor shall call both the Anchorage Fire Department dispatcher at 522-1122 and the local fire station which would respond to an alarm and let them know you will be working on the system and for approximately how long. Second the contractor shall call Guardian Security at 277-1975 and notify the dispatcher that you have called the Fire Department, what type of work you are planning to do, and approximately how long before you expect to be completed. After the contractor is completed with your work, you must reverse the process by notifying the Fire Department dispatcher and the ASD Dispatcher that you are finished.

7.12.2 The Contractor shall be held responsible for all charges incurred from false fire alarms. Currently the Anchorage Fire Department charges seven hundred fifty dollars and no cents (\$750.00) per false alarm, or current rate charged.

Add the following new Paragraph 7.13, Apprenticeship Utilization Requirements for Contracts:

7.13 APPRENTICESHIP UTILIZATION REQUIREMENTS FOR CONTRACTS

7.13.1 Once awarded a contract by ASD, the prime contractor will be responsible to gather and submit all documentation to ASD to confirm compliance with the Apprenticeship Utilization Policy ("AUP") mandated by Anchorage School Board Policy 3311.1.2. The Prime contractor will provide documentation to ASD to confirm that 15% of the labor hours worked in trades/crafts categories that are included in the Alaskan Federally Registered Apprenticeship Program has been executed by certified apprentices enrolled in those programs, and will provide documentation to confirm that the apprentices listed on the documentation submitted are currently in good standing with their Alaskan Federally Registered Apprenticeship Program. ASD will provide several forms which the prime contractor will be required to fill out in addition to submitting their certified payroll documents. Also, ASD will audit the prime contractor's documentation on the following schedule. Audits for smaller projects will be conducted every 30 days, audits for larger projects the will be done every 90 days. In addition, ASD will conduct on-site audit at non-scheduled intervals to ensure that the apprentices listed on the written documentation are physically on-site. ASD will give a reasonable notice of 24 hours prior to on-site inspections.

7.13.2 The prime contractor will be required to submit the following, at the intervals requested by ASD:

- Certified Payroll for prime and subcontractors.
- Apprenticeship Utilization Form for prime and subcontractors.
- Apprenticeship Utilization Calculation form for prime and subcontractors, which demonstrates labor hours worked by apprentices in applicable crafts/trades categories, and reports status as to whether the apprentices listed are in good standing with their Alaskan Federally Registered Apprenticeship Program.

Add the following new Paragraph 7.14, Preference for Alaska Forest Products:

7.14 PREFERENCE FOR ALASKA FOREST PRODUCTS

7.14.1 Preference for Alaska Forest and Agricultural Products

This project is funded by state money in which the use of timber, lumber, and manufactured lumber products are required, and, therefore, only timber, lumber, and manufactured lumber products originating in this state from local forest products shall be used whenever practical.

Pursuant to AS 36.15.050 and AS 36.30.322, agricultural and timber, lumber and manufactured lumber products harvested in Alaska shall be used in state funded projects whenever they are priced no more than seven percent above agricultural/wood products harvested outside the state and are of a like quality as compared with agricultural/wood products harvested outside the state. The Contractor shall maintain records which establish the type and extent of Alaska agricultural/wood products utilized. When such products are not utilized, the Contractor shall document the efforts the Contractor made towards obtaining agricultural/wood products harvested in Alaska and include in this documentation a written statement that the Contractor contacted the manufacturers and suppliers identified on the Department of Commerce and Economic Development's list of suppliers of Alaska forest products concerning the availability of agricultural/wood products harvested in Alaska and, if available, the product prices. The Contractor shall complete this documentation at a time determined by the district's project manager.

The Department of Commerce and Economic Development's list of suppliers of Alaska forest products is available at:

<http://www.commerce.state.ak.us/ded/dev/prodpref/fppproduct.cfm>

The Contractor's use of agricultural/wood products that fail to meet the requirements of this section shall be removed and replaced in accordance with **Division 0, Section 00700, paragraph 13.3** of the contract. In addition, pursuant to AS 36.15.050(d), the district may withhold payment until the Contractor complies with this section.

To clarify, the actions required by the successful bidder awarded the contract are as follows:

- For all lumber items required under the contract the Contractor will contact all applicable suppliers of Alaska forest products to determine availability and cost.
- Contractor must use lumber from the suppliers of Alaska forest products unless the cost of the Alaska forest products that are of like quality is seven percent higher than non-Alaska produced forest products, or the Alaska forest products are not available.
- Contractor must maintain records showing efforts made in using Alaska forest products or evidence of Alaska forest products not being available or reasonably competitive.
- The records showing compliance with the Alaska forest products preference must be provided to Owner during the submittal process (Division 1, Section 01300).
- Per AS 36.15.010 if the Contractor fails to provide evidence regarding proper sourcing and comparison of Alaska forest products, the District shall withhold payment until the Contractor complies.

ARTICLE 9

Add the following new Paragraph 9.12, Liquidated Damages:

9.12 LIQUIDATED DAMAGES

- 9.12.1 Should the Contractor fail to substantially complete the Work on or before any date stipulated for Substantial Completion (or such later date as may result from extension of time granted by the Owner), he shall pay the Owner, as liquidated damages, the sum of one thousand dollars and no cents (\$1,000.00) for each consecutive calendar day that terms of the contract remain unfulfilled beyond the date allowed by the Contract, which sum is agreed upon as a reasonable and proper measure of damages which the Owner will sustain per day by failure of the Contractor to complete work within time as stipulated; it being recognized by the Owner and to the Contractor that the injury to the Owner which could result from a failure of the Contractor to complete on schedule is uncertain and cannot be computed exactly. In no way shall costs for liquidated damages be construed as a penalty on the Contractor.
- 9.12.2 For each consecutive calendar day that the Work remains incomplete after the date established for Final Completion, the Owner will retain from the compensation otherwise to be paid to the Contractor the sum of one thousand dollars and no cents (\$1,000.00). This amount is the minimum measure of damages the Owner will sustain by failure of the Contractor to complete all remedial work, correct deficient work, clean up the project and miscellaneous tasks as required to complete all work specified.
- 9.12.3 In no instance shall more than one thousand dollars and no cents (\$1,000.00) a day are assessed for liquidated damages for work, which remains incomplete.

ARTICLE 10

Add the following new Paragraph 10.4, Compliance:

10.4 COMPLIANCE

- 10.4.1 When the school is in session the Contractor will be restricted to the areas, which do not interfere with school operations. These areas shall be safety and security fenced to not impact school operations. Additional areas may be utilized upon concurrence of the Project Manager. The Contractor shall minimize his impact on education while his work is in progress. Workers must stay out of school while school is in session. All renovation work in the existing school, including sprinklers, must be performed while school is not in session. If scheduling pushes this work into the school session, then the work must be performed on nights and weekends.
- 10.4.2 The Contractor must maintain interior building fire exits through the construction areas and maintain these exits during all school operation hours. These exit routes may not be modified without concurrence of the Project Manager and the School Principal.

ARTICLE 11

Remove and replace Section 11.3.3.1 with the following:

11.3.3.1 The Contractor shall maintain an umbrella liability policy according to the following:

Projects < \$2 million construction cost - \$1,000,000 per occurrence and annual aggregate.

Projects < \$10 million construction cost – \$5,000,000 per occurrence and annual aggregate.

Projects > \$10 million construction cost – \$10,000,000 per occurrence and annual aggregate.

This requirement does not apply to Subcontractors.

ARTICLE 12

Article 12, 12.5.2: Delete this section in its entirety and replace with the following:

Disputes between the Owner and the Contractor will be processed through the appeal process described in 12.5.3.

Article 12, 12.5.3: Delete this section in its entirety and replace with the following:

12.5.3 Appeal Process

12.5.3.1 The contractor will submit in writing the issue(s) being claimed and the Project Manager will review. The Project Manager may visit the site, schedule a review hearing, or request additional information in order to fully evaluate the issues of the claim. The Project Manager will send the written decision to the Contractor within ten (10) days of receipt of claim.

12.5.3.2 If the Contractor does not agree with the decision of the Project Manager, within ten (10) days from the receipt of the written decision by the Project Manager, the Contractor may request an appeal of the decision to the Senior Director of Capital Planning & Construction. The Senior Director of Capital Planning & Construction will then have ten (10) days to review the issue(s) and send a written decision to the Contractor.

12.5.3.3 If the Contractor does not agree with the decision of the Senior Director of Capital Planning & Construction, within ten (10) days from the receipt of the written decision by the Senior Director of Capital Planning & Construction, the Contractor may request an appeal of the decision to the Chief Operating Officer. The Chief Operating Officer will then have ten (10) days to review the issue(s) and send a written decision to the Contractor.

SUPPLEMENTARY GENERAL CONDITIONS TO THE CONTRACT FOR CONSTRUCTION

Division 0
Section 00800

- 12.5.3.4 If the Contractor does not agree with the final decision rendered by the Chief Operating Officer, it may pursue litigation.
- 12.5.3.5 The Contractor may bring no action on claims unless the claims have been properly raised in accordance with all notice provisions of the conditions and considered in the above dispute-resolution procedures.
- 12.5.3.6 The Contractor shall diligently carry on the Work and maintain the progress schedule during any dispute-resolution proceedings, unless otherwise agreed in writing.
- 12.5.3.7 Any step in the process identified above can be waived only by explicit written waiver by both parties.

Article 12, 12.5.4: Delete this section in its entirety.

END OF SECTION

WAGE RATES

I. GENERAL

A. STATE OF ALASKA PREVAILING WAGE SCALE AND ALASKA HIRE

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the Contract. Among other things, the requirements of Alaska's Little Davis Bacon Act (AS 36.05.010) are applicable to this project. Each bidder must inform himself/herself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful bidder of his/her obligation to furnish all material and labor necessary to carry out the provisions of the Contract.

State Labor Wage and Hour Administration Pamphlets No. 600 for Laborers' and Mechanics' are updated on April 1, and September 1. It is the responsibility of the bidder to obtain the new labor wage and hour rates when available from the State of Alaska Department of Labor, and to use the Prevailing wage scale and hiring requirements when formulating your bid.

For copies of this pamphlet, contact the nearest office of the Division of Labor Standards and Safety, Wage and Hour office or visit the internet site at:

<http://labor.state.ak.us/lss/pamp600.htm>

END OF SECTION

SUMMARY OF WORK

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of this Contract comprises the general construction of the facility identified in the Solicitation including all noted site improvements.
- B. Definition of Site: Wherein the term Site is used in the contract documents, it shall mean the areas where work is to be performed; located as identified in the Solicitation and on the Contract Drawings.
- C. Acceptance of Site: The Contractor shall fully inform himself of the areas in which work is to be processed, material delivered, and limitation in working conditions, and access to work areas.
- D. Existing Conditions: The drawings may not show all arrangements and condition of the site as they now exist. The Contractor shall be responsible for a complete visual inspection.

1.03 CONTRACT

- A. Construct the work under a single fixed price contract as bound herein.
- B. It is the intent of these documents to require all work for a complete facility and plant with only minor owner-furnished items to be incorporated. See technical sections for specifics.

1.04 WORK FURNISHED AND INSTALLED BY OWNER

- A. Equipment and furniture as noted in documents. Other Contractors or ASD Maintenance personnel may be performing work at this facility concurrent with this project. See Section 1.07 below for requirements concerning coordination with Contractor's work.

1.05 GENERAL PROJECT DESCRIPTION

- A. General Description:

Within Academic Areas Identifies as Areas E and F base bid to include:

- Install new fire sprinkler system
- Add structural reinforcement to certain walls to mitigate future earthquake damage
- Remove existing suspended ceiling and light fixtures for installation of sprinklers and for structural reinforcements
- Install new suspended ceiling and light fixtures
- Remove and replace existing exterior canopy at Area F West entrance

ADDITIVE ALTERNATE No. 1 – Repair exterior plaza deck at Area B South of Gym

ADDITIVE ALTERNATE No. 2 – At Areas E and F renovate existing toilet rooms including

replacement of all plumbing fixtures, toilet partitions, floor and wall finishes and toilet room accessories, demolish heating convectors and replace with new mechanical. Toilet renovations shall be ADA compliant.

ADDITIVE ALTERNATE No. 3 – Throughout the School Building repair/replace existing fire alarm system.

ADDITIVE ALTERNATE No. 4 – At Area E replace existing storefront system and associated fin tube at one location.

- B. Sequence the start, conduct and completion of Work as required in Section 00200, Project Schedule Milestone Dates.

1.06 CONTRACTOR'S USE OF PREMISES

- A. Limit use of premises for work and for storage to allow for:
 1. Area of site indicated on Contract Drawings
 2. Owner occupancy of existing building
 3. Public use
 4. Coordinated use of premises under direction of Project Manager.
 5. Full responsibility for protection and safekeeping of products under this Contract stored at Site.
 6. Moving any stored products, under Contractor's control, which interfere with operations of Owner or separate Contractor.

1.07 OWNER'S USE OF PREMISES

- A. During the regular school year, conduct operations to minimize interference with normal school operations.
- B. School is scheduled to have Summer School during Summer 2024 and 2025, in areas outside the construction Area E and F, construction work will need to be coordinated with the school to minimize impact.
- C. Schedule any work which could interfere with school operations during summer vacation or when the school is not in session during the regular year.
- D. Cooperate with Project Manager in conducting operations to minimize conflict with and to facilitate Owner usage as established by the Project Manager.
- E. Schedule work to maintain Owner's continuous operation. Include in contract sum sufficient funds as may be required for any "after-hours" work caused by this requirement. No additional payment to Contractor will be authorized because of Contractor's failure to anticipate required "after-hours" work.
- F. At all times conduct operation as to insure the least inconvenience to students, staff, visitors, and the general public.
- G. The contractor shall provide advance notice at least 72 hours prior to any utility outages or other operations anticipated to inconvenience the school activities. The Project Manager will review and evaluate the request. The contractor may have to reschedule the operations to another time that will not impact school activities.
- H. The Contractor shall be responsible for maintaining power to the Fire Alarm, Security and Network systems to ensure they are in proper working order throughout the project. If the

systems must be off-line during the project, the Contractor shall obtain written approval from the Project Manager. During any time in which the fire alarm or security system is not operational, the Contractor shall provide a fire watch and security watch 24 hours a day, 7 days a week, for the entire period of the shutdown at no additional cost to ASD. The Contractor shall notify the ASD Project Manager of the intended method 72 hours prior to the shutdown.

1. An acceptable method of maintaining power to the fire alarm and security panels includes maintaining power during the entire period of the Electrical Utility Shutdown.
- I. While school is occupied by students and the general public the contractor must keep operational the emergency egress lighting.

1.08 COORDINATION OF NOISE, DUST AND FUMES

- A. Contain noise, dust and fumes within work area. Notify Project Manager at least 24 hours prior to any necessary excessive noise, dust or fumes. Comply with the Project Manager's instructions.

1.09 PRODUCTS FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR

- A. Owner's Responsibilities:
 1. Arrange for and deliver necessary shop drawings, product data, and samples to Contractor.
 2. Arrange and pay for product delivery to Site in accordance with construction schedule.
 3. Deliver supplier's bill of materials to Contractor.
 4. Inspect deliveries jointly with Contractor
 5. Submit claims for Transportation damage.
 6. Arrange for replacement of damaged, defective, missing or otherwise unacceptable items.
 7. Arrange for manufacturer's warranties, bonds, service, and inspections as required.
- B. Contractor's Responsibilities:
 1. Designate delivery date for each product in construction schedule.
 2. Receive and unload products at Site.
 3. Promptly inspect products jointly with Owner, record shortages, damaged or defective items.
 4. Handle products at Site, including uncrating and storage.
 5. Protect products against damage and discoloration.
 6. Assemble, install, connect, adjust, and finish products, as stipulated in respective Specification Sections.
 7. Clean, repair, or replace items damaged by Contractor.

1.10 SALVAGE RIGHTS

- A. Except where noted otherwise on contract documents, existing equipment which is removed as a part of the work shall become the property of the Contractor to dispose of as he sees fit.
- B. Remove scheduled materials and equipment without damaging items. Store items in protected environment. Coordinate with Owner for pick up and/or delivery to the owner. If delivered to the owner include project name and school for easy identification.

1.11 USE OF OWNER'S PROPERTY AND EQUIPMENT

- A. Use of Owner's property or equipment such as tools, ladders, furniture, janitorial equipment and supplies, etc., is strictly prohibited.

1.12 PERMITTING

- A. Contractor shall obtain all necessary building permits required to complete the scope of work identified in the contract documents. These include any/all subcontractor or specialty permits.
- B. Contractor shall ensure all required Municipal inspections, in accordance with the aforementioned permits, are requested and conducted prior to covering, closing or concealing the work in the field. Understanding and adhering to all MOA inspection requirements is mandatory. The Owner is not liable for re-inspection or rework costs associated with non-conforming or prematurely concealed work.
- C. Contractor shall maintain an inspection log and retain copies of all inspection reports, on site, for review by inspection officials and district project representatives.
- D. The District will be requiring preconstruction meeting with municipality building safety department.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION

3.01 USE OF PREMISES

- A. Contractor shall have primary use of designated site and premises except for any of those, which are not directly related to the execution of the work. Any potential school program activities will be communicated and a work around plan developed.
- B. Contractor shall provide temporary partitions to separate the area of work from the school use areas.
- C. Contractor shall have primary use of designated site and new building premises from notice to proceed through the substantial completion of the building.
- D. Contractor shall have limited use of the new building after the date of Substantial Completion.

END OF SECTION

BID ALTERNATES

PART 1. GENERAL

1.01 DESCRIPTION

A. Work included:

To allow the Owner to compare total costs where alternate materials and methods might be used, certain alternatives have been established as described in this Section of these Specifications.

B. Related work described elsewhere:

1. Pertinent Sections of these Specifications describe materials and methods required under the various alternatives.
2. The method for stating the proposed contract amount is described on the Bid Form.

1.02 SUBMITTALS

- A. All alternatives described in this Section of these Specifications are required to be reflected in the space provided on the Bid Form for this work. However, do not submit alternatives other than those described in this Section. Amounts submitted for alternatives shall include all overhead, profit, bonds, insurance and similar related costs.

1.03 BASE BID

- A. Includes all Work shown on Drawings or included in Specifications, excepting only that Work specifically noted in the following Alternate Bids, and that Work specifically noted as excepted.

PART 2. PRODUCT

2.01 DESCRIPTION

- A. This Project consists of the Basic Bid and noted Alternates. The Contract Documents have been prepared to show both basic and alternate work. In case the alternate work is not included in the contract work it will be the Contractor's responsibility to construct basic work by excluding alternate work as described below. Revised drawings excluding alternate work will not be issued.
- B. Work required by the following alternates shall include the finishing of all labor and materials to provide a complete and usable finished installation.
- C. The extent of alternates is described on the Drawings or specified herein.
- D. The Technical Specifications shall apply to all alternates unless modified herein.

2.02 LIST OF ALTERNATES

- A. Alternate Number One: Repair exterior plaza deck at Area B South of Gym
- B. Alternate Number Two: At Areas E and F renovate existing toilet rooms including

replacement of all plumbing fixtures, toilet partitions, floor and wall finishes and toilet room accessories, demolish heating convectors and replace with new mechanical. Toilet renovations shall be ADA compliant.

- C. Alternate Number Three: Throughout the School Building repair/replace existing fire alarm systems.
- D. Alternate Number Four: At Area E replace existing storefront system and associated fin tube at one location.

PART 3. EXECUTION

3.01 ADVANCE COORDINATION

- A. Immediately after award of the contract, or as soon thereafter as the Owner has made decision on which if any alternatives will be selected, thoroughly and clearly advise all necessary personnel and suppliers as to the nature and extent of alternatives selected by the Owner. Use all means necessary to alert those personnel and suppliers involved as to all changes in the work caused by the Owner's selection or rejection of alternatives.

END OF SECTION

BID ALLOWANCES

PART 1. GENERAL

1.01 DESCRIPTION

- A. Work included:
- B. Assignment of the contract between the Anchorage School District and Siemens Industry, Inc. to the prime contractor.
- C. Costs, clarifications, and exclusions for the Siemens Industry, Inc. work is indicated on the attached Proposal dated **TBD**.
- D. No direct cost for the Siemens Industry, Inc. work as identified in the attached Siemens Proposal shall be included in the base bid. (Section 00300)
- E. The Prime Contractor's burden and overhead for administration of the Siemens Industry, Inc. work and exclusions identified in the Siemens proposal shall be included in the base bid. (Section 00300)

END OF SECTION

PROJECT COORDINATION

PART 1. GENERAL

1.01 GENERAL CONTRACTOR

- A. Coordinate work of his own employees and subcontractors and coordinate his work with that of other contractors and Owner.
- B. Expedite his work to assure compliance with schedules.
- C. Comply with orders and instructions of the Project Manager.
- D. Monitor and control the use of site:
 - 1. Supervise field engineering and site layout.
 - 2. Allocate space for each subcontractor's use for field offices, sheds, work and storage areas.
 - 3. Establish access, traffic, parking allocations, and regulations.

1.02 GENERAL AND SUBCONTRACTORS SHALL DILIGENTLY COMPLY WITH THE FOLLOWING:

- A. Cooperate in planning and layout of the work well in advance of operations. Inform other contractors of requirements at proper time to prevent delay or revisions.
- B. Be informed of the requirements of other contractors and check own work for conflicts with the work of others.
- C. Ensure delivery of materials and performance of work on coordinated schedule with other contractors.
- D. Be responsible for proper layout of the work, and for all lines and measurements for all of the work executed under the contract documents. Verify the figures shown on the drawings before laying out the work and report any inaccuracies in writing to the Project Manager before commencing work. The Owner, Architect or their representative will in no case assume the responsibility for layout of the work.
- E. The mechanical and electrical trades shall be responsible for the layout of the ductwork, piping and conduits based on the reference lines established.

1.03 COORDINATING UTILITIES

- A. Cooperate and coordinate work with all utilities to be installed for service to Project. Utilities may include, but are not limited to water, sewer, natural gas, telephone, electrical, and cable television. Contractor shall maintain communication with utilities in order to coordinate time and requirements of utilities' installation.
- B. Contractor shall provide all work necessary to comply with requirements of Contract Documents for Utility work that does not meet Contract Document requirements, or for work that is disturbed by utility installation.

1.04 OWNER NOTIFICATION/REIMBURSEMENT

- A. Provide the Owner forty-eight (48) hours advance notice of his intention to work overtime,

nights, Sundays or holidays, or anytime outside the usual working hours. In no case will the Contractor do any such work without first notifying the Owner to permit arrangements for proper inspection. Unless of an emergency nature, work performed in violation of this paragraph will not be paid for.

- B. Reimburse the additional cost to the Owner for inspection work on Sundays or recognized holidays. Such reimbursement shall include all additional costs to the Owner.
- C. Reimbursement for inspection or observation required of the Project Manager or the Engineer on Sundays or recognized holidays shall be at the rate of One Hundred Fifty dollars (\$150.00) per man-hour of work.
- D. The contractor shall reimburse the additional cost to the owner, architect and consultants for inspection work beyond a first substantial of first final completion inspections. The contractor is expected to be virtually complete at time of substantial completion inspection with only minor punchlist items remaining. Should punchlist items remain at time of final inspection and should subsequent inspections be required, the contractor shall pay all costs for all.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

CUTTING AND PATCHING

PART 1. PART GENERAL

1.01 DESCRIPTION OF WORK

- A. Cutting and patching is defined to include, but it not necessarily limited to, the cutting and patching of nominally completed work, and is defined to exclude integral cutting and patching during the manufacturing, fabricating, erecting, and installing process for individual units of work.
- B. Contractor shall be responsible for all cutting, fitting, and patching required to complete the work or to:
 - 1. Accommodate the coordination of work.
 - 2. Provide for installation of other work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to requirements of Contract Documents.
 - 5. Uncover other work for access or inspection.
 - 6. Obtain samples for testing or similar purposes.
 - 7. Provide routine penetrations of nonstructural surfaces for installation of piping and electrical conduit.

1.02 RELATED REQUIREMENTS

- A. Section 00700 Article 4.14.
- B. Section 01010 - Summary of Work.
- C. Individual Specification Sections:
 - 1. Cutting and patching incidental to work of the Section.
 - 2. Advance notification to other Sections of openings required in work of those Sections.
 - 3. Limitations on cutting structural members.

1.03 SUBMITTALS

- A. Ten (10) days prior to beginning any demolition activities, the Contractor shall provide written notification to EPA, in accordance with NESHAP regulations, with copy to Project Manager. Notice shall indicate asbestos containing materials are or are not anticipated to be encountered. If no asbestos is anticipated, a negative declaration is made addressing 40CFR61.146 (a), (b) and (c,1-5).
- B. Submit written request in advance of cutting or alteration which affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather-exposed or moisture-resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight-exposed elements.
 - 5. Work of Owner or separate contractor.
- C. Include in Request:
 - 1. Identification of Project.
 - 2. Location and description of affected work.
 - 3. Necessity for cutting and alteration.

4. Description of proposed work. Designate:
 - a. Scope of cutting and patching.
 - b. Contractor and trades to execute work.
 - c. Products proposed to be used.
 - d. Extent of refinishing.
5. Date and time work will be executed.

PART 2. PRODUCTS

2.01 MATERIALS

- A. For replacement of work removed, comply with specifications for type of work to be done, unless otherwise noted.
- B. Provide materials for cutting and patching which will result in equal to or better than the work being cut and patched in terms of performance characteristics and visual effect where applicable.

PART 3. EXECUTION

3.01 GENERAL

- A. Execute cutting, fitting, and patching to complete Work, and to:
 1. Fit the several parts together, to integrate with other Work.
 2. Uncover work to install or correct ill-timed Work.
 3. Remove and replace defective and non-conforming Work.
 4. Remove samples of installed Work for testing.
 5. Provide openings in elements of Work for penetrations of mechanical and electrical work.
 6. Repair surfaces damaged by removal or relocation of surface mounted or built-in items.

3.02 INSPECTION

- A. Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- B. Do not cut and patch work which is exposed to view in a manner resulting in a reduction of visual qualities or resulting in substantial evidence of the cut and patch work. Remove and replace work judged by Project Manager to be visually unsatisfactory.
- C. After uncovering, inspect conditions affecting performance of work.
- D. Beginning of cutting or patching means acceptance of existing conditions.

3.03 PREPARATION

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by cutting and patching operations, as directed. Return adjacent areas to condition existing prior to start of work.
- B. Provide supports to assure structural integrity of surroundings; devices and methods to

protect other portions of Project from damage.

- C. Provide protection from elements for areas which may be exposed by uncovering work; maintain openings free of water.

3.04 PERFORMANCE

- A. Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.
- B. Restore work with new products in accordance with requirements of Contract Documents.
- C. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Maintain all fire assembly rating wall or area separation construction in accordance with applicable codes.
- D. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

END OF SECTION

MECHANICAL AND ELECTRICAL COORDINATOR

PART 1. GENERAL

1.01 DESCRIPTION

- A. Mechanical and electrical coordinator.
- B. Submittals.
- C. Coordination required.
- D. Coordination documents.
- E. Coordination of submittals.
- F. Coordination of substitutions and modifications.
- G. Observation of Work.
- H. Documentation.
- I. Inspection and acceptance of equipment.
- J. Equipment start-up.

1.02 RELATED SECTIONS

- A. Section 01010 - Summary of Work.
- B. Section 01300 - Submittals: Shop drawings, product data, and samples.
- C. Section 01650 - Starting of Systems: Starting of systems. Testing, Adjusting, and Balancing of Systems. Systems Demonstration.
- D. Section 01700 - Project Closeout: Project closeout procedures, project record documents, operation and maintenance data, warranties, and spare parts and maintenance materials.

1.03 MECHANICAL AND ELECTRICAL WORK COORDINATOR

- A. The Contractor shall employ a person, technically qualified and administratively experienced in field coordination for the mechanical and electrical work required for this Project, for the duration of the Work.

1.04 SUBMITTALS FOR REVIEW

- A. Submit coordination drawings and schedules prior to submitting shop drawings, product data, and samples.

1.05 COORDINATION REQUIRED

- A. Coordinate work of Divisions 23, and with work of other divisions.

- B. Coordinate progress schedules, including dates for submittals and for delivery of Products.
- C. Participate in progress meetings. Report on progress of Work to be adjusted under coordination requirements, and any required changes in schedules. Transmit minutes of meetings and Reports to concerned parties.

1.06 COORDINATION DOCUMENTS

- A. Prepare coordination drawings to organize installation of Products for efficient use of available space, for proper sequence of installation, and to identify potential conflicts.
- B. Identify electrical power characteristics and control wiring required for each item of equipment.
- C. Maintain documents for the duration of the Work, recording changes due to site instructions, modifications or adjustments.
- D. After the Anchorage School District's review of original and revised documents, reproduce and distribute copies to concerned parties.

1.07 COORDINATION OF SUBMITTALS

- A. Review Shop Drawings, Product Data, and Samples for compliance with Contract Documents and for coordination with work of the Project Manual. Transmit for review, copy reviewed documents to the Anchorage School District.
- B. Check field dimensions and clearances and relationship to available space and anchors.
- C. Check compatibility with equipment and Work of other sections, electrical characteristics, and operational control requirements.
- D. Check motor voltages and control characteristics.
- E. Coordinate controls, interlocks, wiring of pneumatic switches, and relays.
- F. Coordinate wiring and control diagrams.
- G. Review the effect of any changes on work of other sections.
- H. Verify information and coordinate maintenance of record documents.

1.08 COORDINATION OF SUBSTITUTIONS AND MODIFICATIONS

- A. Review proposals and requests from Subcontractors.
- B. Verify compliance with Contract Documents and for compatibility with Work and Products of other sections. Submit with recommendation for action.

1.09 OBSERVATIONS OF WORK

- A. Observe Work for compliance with Contract Documents.
- B. Maintain a list of observed deficiencies and defects; promptly submit a written report bi-weekly.

1.010 DOCUMENTATION

- A. Observe and maintain a record of tests. Record:
 - 1. Specification section number.
 - 2. Product and name of Subcontractor.
 - 3. Name of testing agency and name of inspector.
 - 4. Name of manufacturer's representative present.
 - 5. Date, time, and duration of tests.
 - 6. Type of test, and results. Retesting required.
 - 7. Submit copies of documentation to the Anchorage School District.

1.011 EQUIPMENT START-UP

- A. Verify utilities, connections, and controls are complete and equipment is in operable condition as required by Section 01650.
- B. Observe start-up and adjustments; record time and date of start-up, and results.
- C. Observe equipment demonstrations to Owner; record times and additional information required for operation and maintenance manuals.

1.012 INSPECTION AND ACCEPTANCE OF EQUIPMENT

- A. Prior to inspection, verify that equipment is tested, operational, clean, and ready for operation.
- B. Assist the Anchorage School District with review. Prepare list of items to be completed and corrected.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

FIELD ENGINEERING

PART 1. GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide and pay for field engineering services required for project, i.e., civil, structural, or other professional engineering services required to execute Contractor's construction methods.

1.02 RELATED REQUIREMENTS

- A. Section 00700 and 00800 General Conditions of the Contract and Supplementary General Conditions to the Contract for Construction.
- B. Section 01010: Summary of Work.
- C. Section 01700: Project Close Out.

1.03 QUALIFICATIONS OF SURVEYOR AND ENGINEER

- A. Provide Qualified Professional Engineer and Registered Land Surveyor with current Alaska license and acceptable to Contractor and Owner.

1.04 SURVEY REFERENCE POINTS

- A. Locate and protect benchmarks, monuments, and other control points prior to starting site work, preserve all permanent points during construction.
 - 1. Make no changes or relocations without prior written notice to Project Manager.
 - 2. Report to Project Manager when any reference point is lost, destroyed or required relocation because of necessary changes in grades or locations.
 - 3. Require surveyor to replace project control points which may be lost or destroyed and establish replacements based on original survey control.

1.05 PROJECT SURVEY REQUIREMENTS

- A. Establish a minimum of two permanent benchmarks on site, referenced to data established by survey control points.
- B. Record locations, with horizontal and vertical data, on Project Record Documents.
- C. Establish and identify lines, levels, contours, and datum by instrumentation or similar appropriate means for:
 - 1. Stakes for grading, fill, and topsoil placement.
 - 2. Utility slopes and invert elevations.
 - 3. Batter boards for structures.
 - 4. Building foundation, column locations, and floor levels.
 - 5. Controlling lines and levels required for mechanical and electrical trades.
- D. From time to time, verify layouts by same methods.

1.06 RECORDS

- A. Maintain a complete, accurate log of all control and survey work as it progresses.

1.07 SUBMITTALS

- A. Submit name and address of Surveyor and Professional Engineer to Project Manager.
- B. On request of Project Manager, submit documentation to verify accuracy of field engineering work.
- C. Submit certificate signed by Registered Engineer and Surveyor certifying that elevations and locations of improvements are in conformance with Contract Documents in the form of an "As-Built" survey.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

REGULATORY REQUIREMENTS

PART 1. GENERAL

1.01 BUILDING CODES

- A. Construction which is not governed by a local building code, or the Contract Specifications will be governed by the more stringent provisions of the latest published edition of Statute adopted edition with MOA local amendments, of the following applicable codes and regulations:

1. International Building Code (IBC)
2. International Existing Building Code (IEBC)
3. International Energy Conservation Code (IECC)
4. International Fuel Gas Code (IFGC)
5. International Mechanical Code (IMC)
6. International Fire Code (IFC)
7. National Electrical Code (NEC)
8. Uniform Plumbing Code (UPC)
9. ASHRAE 90-75 as applicable to Alaska
10. National Fire Code, Volumes 1-10
11. National Electrical Safety Code
12. NFPA Life Safety Code
13. NFPA National Fire Code
14. ADA Guidelines
15. Accessible and Useable Buildings and Facilities (ICC/ANSI A117.1)

1.02 APPLICABLE STANDARDS

- A. Where indicated, comply with the requirements and recommendations of the standards and other publications, except to the extent more detailed or more stringent requirements are indicated, including those of applicable codes and governing regulations.
- B. Where two or more standards or recommendations of trade associations apply to the same quality control requirement for the work, comply with the most stringent. Refer uncertain instances to the Project Manager for a decision.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

ABBREVIATIONS AND DEFINITIONS

PART 1. GENERAL

1.01 ABBREVIATIONS

- A. References in the contract documents to publications and recommendations by either name or abbreviation thereof include but are not necessarily limited to the following trade associations, technical societies, government agencies, recognized authorities and standards.

AAMA	Architectural Aluminum Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AGC	The Associated General Contractors of America
AI	The Asphalt Institute
AIA	The American Institute of Architects
AISC	American Institute of Steel Construction, Inc.
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ANSI	American National Standards Institute
APA	American Plywood Association
ASAHC	American Society of Architectural Hardware Consultants
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
ASME	American Society of Mechanical Engineers
ASTM	American Society for testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWPB	American Wood-Preservers' Bureau
AWS	American Welding Society, Inc.
CPSC	Consumer Product Safety Commission
CRA	California Redwood Association
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard of NBS (U.S. Department of Commerce)
CSI	The Construction Specifications Institute, Inc.
EPA	Environmental Protection Agency
FM	Factory Mutual Engineering Corp.
FGMA	Flat Glass Marketing Association
FS	Federal Specification (General Services Administration)
GA	Gypsum Association
HPMA	Hardwood Plywood Manufacturers Association
IBC	International Building Code
MFMA	Maple Flooring Manufacturers Association
MLMA	Metal Lath/Manufacturers Association
NAAMM	The National Association of Architectural Metal Manufacturers
NBFU	National Board of Fire Underwriters
NBHA	National Builders Hardware Association
NBS	National Bureau of Standards (U.S. Department of Commerce)
NEC	National Electrical Code by NFPA
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
N.F.P.A.	National Forest Products Association
NRCA	National Roofing Contractors Association

NSF	National Sanitation Foundation
NWMA	National Woodwork Manufacturers Association, Inc.
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
RIS	Redwood Inspection Service (Grading Rules)
SDI	Steel Deck Institute
S.D.I.	Steel Door Institute
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association, Inc.
SPR	Simplified Practice Recommendation of NBS
SSPC	Steel Structures Painting Council
TCA	Tile Council of America, Inc.
UL	Underwriters' Laboratories, Inc.
WCLA	West Coast Lumbermen's Association
WCLB	West Coast Lumber Inspection Bureau (Grading Rules)
WRI	Wire Reinforcing Institute
WWPA	Western Wood Products Association (Grading Rules)
W.W. P.A.	Woven Wire Products Association

- B. Refer to individual sections for other names and abbreviations of trade associations and standards applicable to specific portions of the work. In particular, refer to Divisions 23 and 26 for names and abbreviations applicable to mechanical and electrical work.

1.02 SPECIFICATION EXPLANATION

- A. The specifications are divided into divisions and sections for the convenience of writing and using. The titles of these are not intended to imply a particular meaning nor to fully describe the work of each division or section, nor to define the limits of any subcontract.
- B. These specifications are of the abbreviated, or "streamlined" type, and may include incomplete sentences.
- C. Omissions of words or phrases such as "the Contractor shall", "in conformity therewith", "shall be", "as noted on the drawings", "according to the plans", "a", "an", "the", and "all" are intentional.
- D. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the drawings.

1.03 DEFINITIONS

- A. Certain terms used generally throughout the specifications (and drawings) are hereby defined as follows:
1. Indicated: A cross reference to details, notes or schedules on the drawings, other paragraphs or schedules in the specifications, and similar means of recording requirements in the contract documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used in lieu of "indicated", it is for the purpose of helping the reader accomplish the cross reference, and no limitation of location is intended except as specifically noted.
 2. Installer: The person or entity engaged by the Contractor or his Subcontractor or Sub-subcontractor for the performance of a particular unit or work at the project site, including installation, erection, application, and similar required operations. It is a general requirement that installers be recognized experts in the work they are

- engaged to perform.
3. Furnish: Except as otherwise defined in greater detail, the term “furnish” is used to mean “...supply and delivery to the project site, ready for unpacking, assembly and installation...”.
 4. Provide: Except to the extent further defined, the term “provide” means to furnish and install, complete and ready for the intended use.

1.04 DRAWINGS, DIMENSIONS AND MEASUREMENTS

- A. Where on any of the drawings a portion of the work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to all other portions of the work.
- B. Wherever a detail is referenced and developed for a specific condition, same or similar detail shall apply to identical or similar conditions elsewhere on project even though not specifically referenced.
- C. Where the word “similar” occurs on the drawings, it shall be interpreted in its general sense and not as meaning identical, and all details shall be worked out in relation to their location and their connection with other parts of the work.
- D. The figured dimensions on the drawings or notes indicating dimensions shall be used instead of measurements of the drawings by scale and shall be strictly complied with.
- E. No scale measurements shall be used as a dimension to work with except on “full size” drawings not dimensioned.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

REFERENCED SPECIFICATIONS AND STANDARDS

PART 1. GENERAL

1.01 QUALITY ASSURANCE

- A. For products or workmanship specified by Referenced Specification or Standard, comply with requirements of the specification or standard, except when more rigid requirements are specified or are required by governing codes.
- B. Except where a specific date is specified, the date of the referenced specification standard is that in effect as of the bid date.
- C. Obtain a copy of all Referenced Specifications and Standards and maintain at Jobsite during the specific work until Substantial Completion of the Project.

1.02 SCHEDULE OF REGULATORY AGENCY REFERENCES

- A. AASHTO American Association of State Highway and Trans. Officials
444 North Capitol Street, N.W.
Washington, DC 20001
- B. AAC Anchorage Administrative Code (and Local Amendments)
Municipality of Anchorage
4700 Elmore Rd
Anchorage, AK 99507
- C. ADA Americans with Disabilities Act
The Disabilities Rights Section
Civil Rights Division
P.O. Box 66738
Washington, DC 20035-6738
- D. ANSI American National Standards Institute
1430 Broadway
New York, NY 1018
- E. ASA American Standards Association
Now known as ANSI (See above)
- F. ASTM American Society for Testing Materials
1916 Race Street
Philadelphia, PA 19103
- G. ATBCB The U.S. Architectural and Transportation Barrier Compliance Board
Suite 1000, 131 F St. NW
Washington, DC 20004-1111
- H. CS Commercial Standards of the Commodities
Division of the Department of Commerce
Washington, DC 20006
- I. FM Factory Mutual Engineering and Research Corporation
P. O. Box 688
Norwood, MA 02062
- J. F.S. Federal Specifications of the United States General Services
Administration
Specifications and Consumer Information Distribution Section (WFSIS)

- Washington, DC 20407
- K. IBC International Building Code published by the International Code Council (ICC)
4051 West Flossmoor Road
Country Club Hills, IL 60478-5795
- L. IEBC International Existing Building Code
Published by ICC (See IBC above)
- M. ICC/ANSI A117.1-2003
Accessible and Usable Buildings and Facilities
Published by ICC (See IBC above)
- N. IECC International Energy Conservation Code
Published by ICC (See IBC above)
- O. IFC International Fire Code
Published by ICC (See IBC above)
- P. IFGC International Fuel Gas Code
Published by ICC (See IBC above)
- Q. IMC International Mechanical Code
Published by ICC (See IBC above)
- R. MOA Municipality of Anchorage MASS Specifications
Public Works Dept.
4700 Elmore Rd
Anchorage, AK 99507
- S. NBFU National Bureau of Fire Underwriters
85 John Street
New York, NY 10017
- T. NEC National Electric Code published by the National Fire Protection Association
(See NFPA below)
- U. NFPA National Fire Protection Association
Battery March Park
Quincy, MA 02269
- V. PS Product Standards of the Commodities
Division of the Department of Commerce
Washington, DC 20203
- W. UPC Uniform Plumbing Code
Published by IAPMO
5001 East Philadelphia Street
Ontario, CA 91761-2816
- X. UL Underwriter's Laboratories
333 Kingston Road
Northbrook, IL 60062
- Y. State of AK State of Alaska Amendments
Fire and Life Safety Regulations
Juneau, AK

1.03 TRADE ASSOCIATION REFERENCES

- A. See specific specification sections.

REFERENCED SPECIFICATIONS AND STANDARDS

Division 1
Section 01090

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

ALTERATION PROCEDURES

PART 1. GENERAL

1.01 DESCRIPTION OF WORK

- A. Part of alteration work may expose portions of the building to the elements. During such periods Contractor shall take all necessary precautions to protect building elements to remain. Any damage due to negligence shall be repaired at no cost to the Owner.
- B. In addition to Cutting and Patching (Section 01045) and cut, move, or remove items as necessary to provide access or to allow alterations and new work to proceed. Include such items as:
 - 1. Repair or removal of hazardous or unsanitary conditions.
 - 2. Removal of abandoned items and items serving no useful purpose such as abandoned piping, conduit, and wiring.
 - 3. Removal of unsuitable or extraneous materials not marked for salvage, such as abandoned furnishings and equipment, and debris such as rotted wood, rusted metals, and deteriorated concrete.
 - 4. Cleaning of surfaces, and removal of surface finishes as needed to install new work and finishes.

1.02 RELATED REQUIREMENTS

- A. Section 00700 and 00800 - General and Supplementary General Conditions.
- B. Section 01045 - Cutting and Patching.
- C. Section 01300 - Submittals.
- D. Section 01500 - Temporary Facilities and Controls.

1.03 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and cleanup of Work of separate sections in preparation for Substantial Completion.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective

Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2. PRODUCTS

2.01 ALTERATION PROJECT PROCEDURES

- A. Materials: As specified in Product Sections; match existing Products and work for patching and extending work.
- B. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- C. Remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring Products and finishes to specified condition.
- D. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.
- E. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patched Work to match existing adjacent Work in texture and appearance.
- F. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation for Project Manager review and approval.
- G. Where a change of plane of 1/8 inch or more occurs, submit recommendation for acceptable transition for Project Manager review and approval.
- H. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.
- I. Finish surfaces as specified in individual Product Sections.

PART 3. EXECUTION (NOT USED)

END OF SECTION

PROJECT MEETINGS

PART 1. GENERAL

1.01 DESCRIPTION

A. Work Included:

1. In general, project meetings will be held weekly at the job site in accordance with a mutually acceptable schedule. The Project Manager will conduct project meetings throughout the construction period.
2. The purpose of the project meetings is to enable orderly review of progress during construction and to provide for systematic discussion and analysis of problems that might arise between the Owner, Project Architect, Project Manager and/or Contractor relative to execution of the work.

B. Related Work described elsewhere:

1. The Contractor's relations with his subcontractors and material suppliers, and discussions relative thereto, are the Contractor's responsibility as described in the General Conditions and are not part of project meetings content.
2. Section 01400 describes the requirements for quality control meetings that will be held in addition to the requirements of this section.

1.02 AUTHORITY DESIGNATION

- A. Persons designated by the Contractor to attend and participate in project meetings shall have all required authority to commit the Contractor to solutions as agreed upon in the project meetings.

1.03 SUBMITTALS

A. Agenda Items:

To the maximum extent possible, advise the Project Manager forty-eight (48) hours in advance of the project meeting regarding all agenda items to be discussed, including tours in advance of the meeting.

1.04 AGENDA

A. Preconstruction Meeting

1. The Project Manager will conduct this meeting within fifteen (15) days after date of Notice to Proceed.
2. Location:
Anchorage School District
Capital Planning & Construction
1301 Labar Street
Anchorage, Alaska 99515
(907) 348-5190
3. Attendance:
 - a. ASD Construction Supervisor

- b. ASD Project Manager
 - c. Architect and his Professional Consultants
 - d. Contractor's Project Manager and Superintendent
 - e. Major Subcontractors, as appropriate
 - f. Major Suppliers, as appropriate
 - g. Others as appropriate
4. Agenda items will include, but not be limited to:
- a. Designation of responsible personnel
 - b. Distribution (by Contractor) and discussion of list of major Subcontractors and Suppliers with addresses and telephone numbers
 - c. Project coordination
 - d. Procedures and processing of:
 - (1) Field decisions
 - (2) Submittals
 - (3) Proposal requests
 - (4) RFI's Change Orders
 - (5) Applications for Payment
 - (6) Schedules and Reports
 - e. Discussion of initial Project Schedule
 - f. Critical work sequencing
 - g. Major equipment deliveries and priorities
 - h. Adequacy of Contract Documents distribution
 - i. Procedures for maintaining Record Documents
 - j. Use of premises:
 - (1) Office, work, and storage area
 - (2) Owner's requirements
 - k. Construction facilities, controls, and construction aids
 - l. Temporary utilities
 - m. Safety and first-aid procedures
 - n. Security procedures
 - o. Housekeeping procedures

B. Progress Meetings:

- 1. The Project Manager will conduct weekly meetings as required, at the Project Site to coordinate the work, answer questions, and resolve problems.
- 2. Meeting Agenda will include but not be limited to:
 - a. Attendees:
List of attendees and company they represent
 - b. Minutes Review:
Corrections, additions, and/or deletions to previous minutes
 - c. Outstanding Action Items:
Review of items not resolved from previous meeting
 - d. Submittal status
 - e. Request for Information status
 - f. Request for Proposal Status
 - g. Schedule Review:
 - h. Project job concerns
 - i. Next meeting
 - j. Summarize and Review of all Action Items:

3. All items to be discussed shall be addressed at the time scheduled on the agenda. All attendees shall familiarize themselves with the agenda and be prepared in advance with their items for discussion.

C. Special Meetings:

The Project Manager may call special meetings at the project site or the office of the Project Manager to coordinate the work, answer questions, and resolve problems.

1.05 MINUTES

- A. The Project Manager will compile minutes of each project meeting and will distribute copies to all interested parties within seven (7) calendar days after the meeting. Items in the minutes shall be numbered consecutively and grouped under divisions and sections. Each item shall be carried forward until resolved.
- B. The minutes compiled by the Project Manager will be the official record minutes and all clarifications and/or corrections shall be transmitted in writing to the Project Manager within fourteen (14) days of date of receipt of the minutes or unless noted during the next scheduled meeting under the appropriate agenda item. Transmitted corrections shall be legibly submitted on company letterhead.
- C. At least one (1) bound volume of all minutes shall be maintained by the Contractor in the job office until project completion.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

SUBMITTALS

PART 1. GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Procedures
- B. Construction Progress Schedules
- C. Schedule of Values
- D. Shop Drawings
- E. Product Data
- F. Samples
- G. Manufacturer's Instructions
- H. Manufacturer's Certificates

1.02 RELATED REQUIREMENTS

- A. Section 01010 - Summary of Work
- B. Section 01311 - Project Schedule
- C. Section 01340 - Shop Drawings, Product Data and Samples
- D. Section 01370 - Schedule of Values
- E. Section 01400 - Quality Control
- F. Section 01630 - Substitution and Product Options
- G. Section 01700 - Project Close Out
- H. Section 01710 - Cleaning
- I. Section 01720 - Project Record Documents
- J. Section 01730 - Operating and Maintenance Data
- K. Section 01750 - Closeout Forms

1.03 PROCEDURES

- A. Deliver submittal documents to the Project Manager using the ASD Procore Construction Management Program. Number each submittal with the section number, dash, numerical order of the submittal, example 03300-1. Add an alpha to each resubmittal, example, 03300-1A. Deliver samples to the Project Manager or Architect as directed to the address listed on the cover of the project manual.

- B. Transmit each item with company submittal. Identify Project, Contractor, subcontractor, major supplier; identify pertinent Drawing sheet and detail number and specification section number, as appropriate. Identify deviations from Contract Documents. Provide space for Contractor and Architect/Engineer review stamps.
- C. Submit initial Progress Schedules and, Schedule of Values in duplicate prior to issuance of Notice to Proceed. After review by the Architect/Engineer, revise and resubmit as required. Submit revised schedules with each application for payment, reflecting changes since previous submittal.
- D. Comply with progress schedule for submittals related to work progress. Coordinate submittal of related items.
- E. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions. Review with subconsultants/suppliers any inability to meet requirements of project. Find solutions with subconsultants/suppliers making conformance with documents possible. Review solutions with owner and architect for acceptance prior to proceeding with work.

1.04 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit Project Schedule as called for in Section 01311, Project Schedule.

1.05 SCHEDULE OF VALUES

- A. Submit Schedule of Values as called for in Section 01370, Schedule of Values.

1.06 SHOP DRAWINGS, PRODUCT DATA & SAMPLES

- A. Submit in the form as called for in Section 01340.

1.07 MANUFACTURERS' INSTRUCTIONS

- A. When required in individual specification section, submit manufacturers printed instructions for delivery, storage, assembly, installation adjusting and finishing, in quantities specified for product data.

1.08 FIELD SAMPLES

- A. Provide field samples of finishes at project site as required by individual specification sections. Install sample complete and finishes. Acceptable samples in place may be retained in completed work.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

PROJECT SCHEDULE

PART 1. GENERAL

1.01 GENERAL REQUIREMENTS

- A. The work under this Section consists of Project Schedule (“Schedule”) requirements including the preparation of a Schedule and Schedule Revisions. The Schedule shall be developed by the Contractor and shall be in accordance with the requirements of this Section 01311. No direct payment will be made to the Contractor for performing and complying with the requirements of this Section 01311.
- B. The Schedule will be prepared by the Contractor for this Project and made available to the Owner. It is intended that the Schedule will reflect the Contractor’s actual construction plan. The existence of schedules, networks, vector charts or any other charts or services, shall in no way relieve the Contractor of the responsibility of the Contract Document including, but not limited to the responsibility of completing the Work within the contract time and the responsibility of planning, scheduling and coordinating the Work.
- C. The Schedule shall be in the form of a bar chart or other format approved by the project manager.

1.02 REFERENCES

- A. Associated General Contractors of America, “Construction Planning & Scheduling,” Copyright January 1994 (AGC’s Manual), also referred to as AGC Publication No. 1107.1. The general principles stated in the AGC’s Manual shall be used in preparing and updating the Project Schedule, except that the requirements of this Section shall govern.
- B. Related Requirements:
 - 1. Section 00700 and 00800 - General Conditions and Supplementary General Conditions
 - 2. Section 00200 - Project Schedule Milestones Dates
 - 3. Section 01370 - Schedule of Values

PART 2. PRODUCTS

2.01 PROJECT SCHEDULE

- A. Within fourteen (14) calendar days following the Notice to Proceed, the Contractor shall submit for the Project Manager’s review, comment and acceptance, a Project Schedule (“Schedule”). The Schedule shall show the activities of work in sufficient detail to demonstrate that the Contractor has a reasonable and workable plan to complete the Project in accordance with the Project Schedule Milestone Dates set forth under Section 00200 of the Contract Documents. The Contractor shall submit two (2) prints of the Schedule, which shall be neatly organized and time scaled from left to right on 11 in. x 17 in. sheets, or 24 in. x 36 in. sheets, at the Contractor’s discretion.
- B. Within five (5) calendar days of receipt of the Schedule, the Project Manager shall meet face to face with the Contractor to review the plan and to determine if there are any concerns regarding the Contractor’s plan to execute the work. If a resubmittal of the Schedule is required by the Project Manager, the Contractor shall revise and resubmit the Schedule incorporating the Project Manager’s comments within seven (7) calendar days after this review meeting. Progress payments will be withheld until the Contractor submits an approvable Schedule.

C. Revisions to the Schedule shall be done in accordance with paragraph 2.02.

2.02 PROJECT SCHEDULE REVISIONS

A. Should the Contractor, after acceptance of the Schedule, desire to change his plan of construction, he shall submit his proposed revisions to the Project Manager, along with a written rationale for the revisions. Only the requested changes accepted by the Project Manager will be incorporated into the Schedule in the next reporting period.

2.03 TIME IMPACT ANALYSIS FOR CONTRACT MODIFICATIONS, CHANGES OR DELAYS

A. If the Contractor believes that a change under Article 12 Paragraph 12.1 causes an increase or decrease in the Contractor's time for completing the Work, he shall complete a Time Impact Analysis that demonstrates how the Contractor proposes to incorporate or has incorporated the Change into the Schedule and the time impact, if any, on the Schedule Milestone Dates set forth under Section 00200 of the Contract Documents.

1. The Time Impact Analysis shall demonstrate the time impact based upon the date the Change in Work is directed by the Project Manager; the status of construction at that point in time; and the event time computations of all affected activities. The event times used in the Time Impact Analysis shall be those set forth in the update of the Schedule in effect at the time the Change in Work is directed by the Project Manager.
2. The Time Impact Analysis is based on an "as-planned" to "as-built" comparison of the event times. In developing an as-built schedule of performance, the Contractor shall utilize actual daily performance data from Schedule Updates and the Contractor's daily construction reports to graphically depict the sequence and manner in which the Contractor actually performed the Work under the Contract.

B. Activity delays shall not automatically mean that an extension of the Contract Time is warranted or due the Contractor. It is possible that a modification, change or delay will not affect projected or as-built critical activities or cause non-critical activities to become critical. A modification, change or delay may result in only absorbing a portion of the available total float that may exist within an activity chain of the Schedule, thereby not causing any effect on the Contract Time.

C. Each Time Impact Analysis shall be submitted as follows:

1. Within fourteen (14) calendar days after receipt of a written order designated or indicated to be a change in accordance with Article 12, Changes in the Work;
2. Within fourteen (14) calendar days after the furnishing of written notice by the Contractor;
3. Within fourteen (14) calendar days from the commencement of a delay related to unforeseeable conditions; provided the Contractor complies with the requirements of the Contract Documents regarding said condition.

D. In cases where the Contractor does not submit a written request for extension of time and Time Impact Analysis within the time stated above in Paragraph 2.03, it is mutually agreed that the Change in the Work does not require an extension of the Contract Time.

E. Acceptance or rejection of each Time Impact Analysis which requests an extension of the Contract Time shall be made by the Project Manager within fourteen (14) calendar days after receipt of each Time Impact Analysis, unless subsequent meetings and negotiations are necessary. Upon acceptance, the Time Impact Analysis shall be incorporated into the Schedule.

F. Time Impact Analysis related to requests for an extension of the Contract Time and/or Change Order work shall be incorporated into and attached to the applicable Change Order(s).

- G. No revision to any Schedule Milestone Date or contractually mandated schedule provisions will be permitted without authorization from the Project Manager.

2.04 COMPLIANCE WITH THE SCHEDULE

- A. The Contractor shall furnish sufficient labor and equipment resources, offices, and facilities, and shall work such hours, including night shift and overtime operations as necessary, to ensure the prosecution of the Work in accordance with the Schedule. If the Contractor falls behind in meeting the Schedule, the Contractor shall take such steps as may be necessary to improve its progress. If the Contractor fails to take such steps, the Project Manager may require the Contractor to increase the hours of work, the number of shifts, overtime operations, the number of workers and/or the amount of construction plant and equipment without additional cost to the Owner. The provisions of this subsection shall not be construed as prohibiting work on Saturdays, Sundays, and holidays, if the Contractor so elects and gives 24 hours' notice to the Project Manager.
- B. Failure of the Contractor to comply with the requirements of this Subsection 2.04 shall be a basis for determination by the Project Manager that the Contractor is not prosecuting the Work with such diligence as will ensure completion of the Work in accordance with the requirements of the Contract Documents. Upon such determination, the Project Manager may terminate the Contractor's right to proceed with the Work or any separable part thereof, in accordance with the clause entitled "Termination of Contract" of the Contract Documents, or may take such other actions as he may deem appropriate.

PART 3. EXECUTION (NOT USED)

END OF SECTION

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 DESCRIPTION

- A. Prepare and submit to the Project Manager with the Construction Schedule, a separate schedule listing dates for submission and of review for shop drawings, product data, and samples, refer to General Conditions 4.12.13.1. Include installing Subcontractors name responsible for that portion of the Work.
- B. Submit Shop Drawings, Product Data, and Samples as may be required, whether mentioned specifically in Contract Documents or not.
- C. Individual submittals shall not include material covering more than one section of the specifications.
- D. Products fabricated and/or installed prior to approval of submittals are subject to demand for removal and replacement with approved products by the Contractor at no additional cost to the Owner.
- E. Shop drawing submittal cannot be used for product substitution submittal. See Section 01630 for required procedure.

1.03 RELATED REQUIREMENTS

- A. Section 01311: Project Schedule
- B. Section 01630: Substitution and Product Options
- C. Section 01720: Project Record Documents

1.04 SHOP DRAWINGS

- A. Prepare original drawings (by Contractor, subcontractor, manufacturer, supplier, or distributor), which illustrate some portion of the work; showing fabrication, layout, setting or erection details.
- B. Prepare shop drawings for this particular project. Drawings prepared for other projects and revised for this project will be rejected.
- C. When necessary, base shop and setting drawings upon actual measurements taken at site and other job conditions. Show any variations and revisions to Contract Documents that are necessary for proper installation of work. Fabrication or installation of work shall not be started until shop or setting drawings have been reviewed and returned by Architect, with his stamp and comments.
- D. Identify details by reference to sheet and detail, schedule or room numbers shown on Contract Drawings.

- E. Minimum sheet size: 8 ½" x 11". Note: Submit full-size sheet submittals. Use of 8 ½" x 11" format subject to readability and approval of architect.

1.05 PRODUCT DATA

- A. Manufacturer's standard schematic drawings:
 - 1. Modify drawings to delete information which is not applicable to project.
 - 2. Supplement standard information to provide additional information applicable to project.
- B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data.
 - 1. Clearly mark each copy and identify pertinent materials, products or models.
 - 2. Show dimensions and clearances required.
 - 3. Show performance characteristics and capacities.
 - 4. Show wiring diagrams and controls.
 - 5. Catalog cuts and descriptive data sheets shall include a complete listing of repair and replacement parts for all equipment and the name and address of a source of supply for parts and service.

1.06 SAMPLES

- A. Physical examples to illustrate materials, equipment or workmanship and to establish standards by which completed work is judged.
- B. Office Samples: Of sufficient size and quantity to clearly illustrate:
 - 1. Functional characteristics of product or material, with integrally related parts and attachment devices.
 - 2. Full range of color, texture and pattern.
- C. Field Samples and Mock-Ups:
 - 1. Erect at project site at location acceptable to Project Manager.
 - 2. Construct each sample or mock-up complete, including work of all trades required in finished work.
 - 3. After review, samples may be used in construction of Project.

1.07 SUBMITTAL REQUIREMENTS

- A. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for review, for securing necessary approvals, for possible revision and resubmittals and for placing orders and securing delivery. Submission of all shop drawings shall be through the General Contractor.
- B. The contractor shall allow at least 14 days for review of original submittals or resubmittals except as follows:
 - 1. Structural steel shop drawings shall be broken down into separate submittal packages for most efficient review and delivered at least two weeks apart.
 - 2. Division 23
 - a. Plumbing shop drawings - 21 days
 - b. Heating shop drawings - 21 days
 - c. Ventilation shop drawings - 28 days
 - d. Coordination shop drawings - 21 days

3. Division 26
 - a. Special Systems shop drawings - 21 days
- C. Submit one (1) reproducible unfolded transparency print of shop drawing. Upon Architects approval, Contractor shall provide five (5) opaque prints for owners use. Transparency will be returned to Contractor for printing and distribution as needed. Additional copies will be returned without review or mark-ups.
- D. Submit four (4) each of samples.
- E. Unless otherwise specifically permitted by the Project Manager, make all submittals in groups containing all associated items. Partial submittals may be rejected.
- F. Accompany submittals with transmittal letter, in duplicate, containing:
 1. Date
 2. Project Title and number
 3. Contractor's name and address
 4. The number of each shop drawing, product data and sample submitted
- G. Submittals shall include:
 1. Date and revision dates
 2. Project title and number
 3. The name of:
 - a. Architect
 - b. Contractor
 - c. Subcontractor
 - d. Supplier
 - e. Manufacturer
 - f. Separate detailer when pertinent
 4. Identification of product or material
 5. Relation to adjacent structure or materials
 6. Field dimensions, clearly identified as such
 7. Specification section number
 8. Applicable standards, such as ASTM number or Federal Specifications.
 9. A blank space, for Architect's review stamp

1.08 CONTRACTOR RESPONSIBILITIES

- A. Review shop drawings, product data, and samples prior to submission.
- B. Include noted and required corrections and indicate by stamp and signature that submittal is acceptable to Contractor. Submittals without stamp and signature will be rejected.
- C. Verify:
 1. Field measurements.
 2. Field Construction criteria.
 3. Conformance with specifications.
- D. Coordinate each submittal with requirements of work and Contract Documents.
- E. Contractor's responsibility for errors and omissions in submittals is not relieved by Architect's review and approval.

- F. Contractor's deviations in submittal requirements shall not relieve Contractor from completing Contract requirements.
- G. The submittal documents shall be transmitted using the ASD Procore Construction Management Program. Number the submittals with the CSI Section then a dash then the numerical order (01650-1). Resubmittals shall have the same number with an alpha at the end. (01650-1A).
- H. Contractor shall update the Procore Submittal Log on a weekly basis until Submittal Process is complete.

1.09 RESUBMITTAL REQUIREMENTS

- A. Revise initial drawings as required and resubmit as specified for initial submittal.
- B. Indicate on drawings any changes which have been made other than those requested by the Architect.
- C. Project data and samples: Submit new data and samples as required for initial submittal.

1.010 ARCHITECT'S DUTIES

- A. Review submittals with a turn-around time for review of original or resubmittal of no more than fourteen (14) calendar days, except as indicated in paragraph 1.07 B above.
- B. The review will be for conformance to the design concept and compliance with information given in the Contract Document. The Architect will make notations directly on the reproducible.
- C. The review is intended to foresee unacceptable products to avoid the possibility of their rejection at the site. The review shall not be construed as:
 - 1. Permitting a departure from the Contract Documents, unless specifically so noted.
 - 2. Relieving the Contractor of the responsibility for errors or omissions.
 - 3. Acceptance of an assembly in which an approved item is a part.
 - 4. Approval of variations from previously approved items.
 - 5. Approval of dimensions.
- D. The Architect will review all samples. Such review will be for appearance only. Compliance with all other requirements is the responsibility of the Contractor.
- E. Affix stamps and initials or signatures certifying the review of submittal.
- F. Where the Contract Documents require the design of the structural, mechanical, or electrical systems or components of systems by a supplier, such systems or components shall be designed by a registered professional engineer and all calculations submitted to the Architect for his records, prior to starting fabrication or installation of the work. The Architect will not be responsible for the designs of such other Professionals.

1.011 VARIATIONS FROM CONTRACT DOCUMENTS

- A. See Section 01630 for procedure.

- B. If the Contractor fails to mention variations from the Contract Documents, he will not be relieved of the responsibility for executing the work in accordance with the Contract Documents.

1.012 SUBMITTALS FOR COLOR SELECTION

- A. The Contractor shall take particular note that color selections cannot be made for the project until such time as all items requiring color selection have been submitted. After such submittal has been made, the Architect with Owner's concurrence will within fourteen (14) days, make a complete color selection for the entire project.
- B. It will be the contractor's responsibility to review the Contract Documents completely to determine items requiring color selection, obtain color samples from the manufacturer and submit to the Architect at the earliest possible date.

1.013 DISTRIBUTION OF SUBMITTALS AFTER REVIEW

- A. Contractor shall distribute copies of shop drawings and product data which carry Architect's stamp, to:
 - 1. Contractor's file (required)
 - 2. Job-site file (required)
 - 3. Record Documents file (required)
 - 4. Other prime Contractors (as required)
 - 5. Subcontractors (as required)
 - 6. Supplier (as required)
 - 7. Fabricator (as required)
 - 8. Others (as required)

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

SCHEDULE OF VALUES

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 REQUIREMENTS INCLUDED

- A. Procedures for preparation and submittal of Schedule of Values.

1.03 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions and Section 00800 Supplemental Conditions of the Construction Contract.
- B. Section 01311 – Project Schedule.

1.04 FORMAT

- A. Schedule of Values shall be submitted on ASD Form 100B.

1.05 CONTENT

- A. List installed value of each major item of work and each subcontracted item of work as a separate line item to serve as a basis for computing values for progress payments. Round off values to nearest dollar.
- B. For each major subcontract, list products and operations of that subcontract as separate line items.
- C. Include work allowances within line item of work.
- D. Coordinate listings with progress schedule.
- E. Component listings shall each include a directly proportional amount of Contractor's overhead and profit.
- F. For items on which payments will be requested for stored products, list the cost of stored products.
- G. The sum of values listed shall equal total contract sum.
- H. In addition to the above, values shall be listed for the following close out items.
 - 1. As-builts.
 - 2. O & M Manuals.
 - 3. Warranties.
 - 4. Landscape Maintenance Warranty.
 - 5. Owner Training.
 - 6. Demobilization (If mobilization is itemized).
 - 7. Project close-out must retain a minimum of \$25,000.00.

1.06 SUBMITTAL

- A. Transmit under transmittal letter. Identify project by title and contract number.

1.07 SUBSTANTIATING DATA

- A. When the Project Manager requires substantiating information, submit data justifying line item amounts in question.
- B. Provide one copy of data with cover letter for each copy of application. Show application number, date and line item by number and description.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

CONSTRUCTION PHOTOGRAPHS

PART 1. GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Construction Photographs.
- B. Submittals.

1.02 RELATED REQUIREMENTS

- A. Section 01720 - Project Record Documents

1.03 PHOTOGRAPHY

- A. Provide photographs of construction throughout progress of work.
- B. Take photographs prior to covering completed work.
- C. Take photographs at beginning and completion of elements of construction.
 - 1. Asbestos Abatement process indicating the phases of abatement including:
 - a. Existing Conditions
 - b. Preparation Prior to Start of Work
 - c. Work in Progress
 - d. Completed Work
 - e. Equipment used for Abatement Processes
 - 2. Roof demolition
 - a. Repairs
 - b. Documentation of interim building protection measures.
 - c. Work in Progress
 - d. Completed work
 - 3. Air infiltration and/or vapor barrier installation
 - 4. Insulation installation
 - 5. Final completion.
- D. The Contractor, on a daily basis, shall photograph the demolition and abatement process. For their own use and distribution, the Project Manager shall on a regular basis, direct photographs and/or video recordings of construction operations and work in progress.

1.04 IMAGES

- A. Digital images to be uploaded to the ASD Procore Construction Management Program Project Folder daily and provided on CD, DVD or flash drive at project completion.
- B. Photo file name to include location, item photographed and orientation of view.

1.05 TECHNIQUE

- A. Provide factual presentation.
- B. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field and minimum distortion.
- C. The Contractor shall furnish access, labor and facilities to assist photographer(s). Photographs shall be taken with a Digital type camera with flash attachment in working order.
 - 1. Furnish the Project Manager with a quantity equal to minimum ten (10) photographs per work area per day ISO appropriate to lighting conditions.

1.06 VIEWS

- A. Consult with Project Manager for instructions on views required.

1.07 SUBMITTALS

- A. Deliver CD with application for payment.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

QUALITY CONTROL

PART 1. GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions and Section 00800 – Supplemental Conditions to the Construction Contract.
- B. Section 01090 - Reference Specifications and Standards.
- C. Section 01300 - Submittals.
- D. Section 01410 - Testing Laboratory Services.
- E. Section 01420 - Special Inspections

1.02 GENERAL REQUIREMENTS

- A. The contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with this section. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence.

1.03 QUALITY CONTROL PLAN

- A. The Contractor shall furnish for review by the Owner, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of this section. The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used.
 - 1. Content of the CQC Plan: The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:
 - a. A description of the quality control organization, including the name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function, including the person assigned responsibility of CQC manager.
 - b. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Owner.)
 - c. Procedures for tracking preparatory and follow-up control phases, verification, and acceptance tests, including documentation.
 - d. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.
 - e. Reporting procedures, including proposed reporting formats.
 - f. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section.
 - 2. Acceptance of Plan: Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory

performance during the construction. The Owner reserves the right to require the Contractor to make changes in the CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3. Notification of Changes: After acceptance of the CQC Plan, the Contractor shall notify the Owner in writing of any proposed change. Proposed changes are subject to acceptance.

1.04 COORDINATION MEETING

- A. After the Preconstruction Conference and before start of construction, the Contractor shall meet with the Project Manager to discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 15 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship with the Owner's special inspection personnel. Minutes of the meeting shall be prepared by the Contractor and signed by both the Contractor and the Project Manager.

1.05 QUALITY CONTROL ORGANIZATION

- A. CQC Manager: The Contractor shall identify as CQC Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC Manager shall be a person with a minimum of ten (10) years' experience in construction with a minimum of three (3) years' experience in Quality Control Management or Construction Inspection, preferably with some formal Quality Control training. This CQC Manager shall be on the site at all times during construction and shall be employed by the prime Contractor.
- B. CQC Personnel: In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC Manager for the following areas: electrical, mechanical, structural, and architectural. Each of these individuals must have either an engineering degree in their respective field and two years of experience or five (5) years of related experience. These individuals are to be responsible to the CQC Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in accordance with this section. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.
- C. ASD CQC Testing Requirements: See Attachment 1 below.

ASD CQC TESTING REQUIREMENTS

MATERIAL TESTED	CHARACTERISTIC TESTED	SAMPLE FREQUENCY	SAMPLING POINT	REPORT DUE
CLASSIFIED FILL MATERIAL AND BACKFILL (TYPE II, TYPE IIA, BLENDED, ETC.)	GRADATION	1 PER SOIL TYPE AND NOTABLE CHANGE IN CHARACTERISTICS	PRIOR TO PLACEMENT	BEFORE USE ON PROJECT
	MOISTURE DENSITY (PROCTOR)			
	COMPACTION/DENSITY	STRUCTURAL = 1 PER LIFT & PER 500 S.F. TRENCHES = 1 PER LIFT & PER 150 L.F. FLATWORK = 1 PER LIFT & PER 5000 S.F.	IN PLACE	PRIOR TO NEXT LIFT
LEVELING COURSE (D-1, RAP, ETC.)	GRADATION	1 PER SOIL TYPE AND NOTABLE CHANGE IN CHARACTERISTICS	PRIOR TO PLACEMENT	BEFORE USE ON PROJECT
	MOISTURE DENSITY (PROCTOR)			
	COMPACTION/DENSITY	FLATWORK = 1 PER LIFT & PER 5000 S.F.	IN PLACE	PRIOR TO NEXT LIFT
STRUCTURAL IN-SITU BASE OF EXCAVATION (BOTTOM OF HOLE)	GRADATION	1 PER IN-SITU STRUCTURAL BOTTOM OF HOLE AND NOTABLE CHANGE IN CHARACTERISTICS	PRIOR TO PLACEMENT	BEFORE BUILDING UPON
	MOISTURE DENSITY (PROCTOR)			
	COMPACTION/DENSITY	BASE OF EX. = 1 PER FOUNDATION AREA	IN PLACE	BEFORE BUILDING UPON
STRUCTURAL CONCRETE	SAMPLING	1 MINIMUM PER PLACEMENT, PER DAY (1-25 C.Y.), 1 EVERY 50 C.Y. THEREAFTER. 1 AFTER EACH ADDITION OF ADMIXTURE OR WATER (SLUMP AND AIR ONLY AFTER ADDING ONLY WATER)	POINT OF PLACEMENT (NOT @ TRUCK)	REPORT-24 HRS VERBAL-TIME OF TEST
	SLUMP			
	AIR CONTENT			
	TEMPERATURE			
	COMP. STRENGTH			
ARCHITECTURAL & CIVIL CONCRETE	SAMPLING	1 MINIMUM PER PLACEMENT, PER DAY (1-25 C.Y.), 1 EVERY 100 C.Y. THEREAFTER.	POINT OF PLACEMENT OR TRUCK CHUTE	REPORT-24 HRS VERBAL-TIME OF TEST
	SLUMP			
	AIR CONTENT			
	TEMPERATURE			
	COMP. STRENGTH			
STRUCTURAL GROUT (BASEPLATES, CMU, ETC.)	SAMPLING	1 PER PLACEMENT, PER DAY	BATCH POINT (ENSURE BATCH CONFORMS TO MFR SPECS)	REPORT-24 HRS VERBAL-TIME OF TEST
	SLUMP			
	AIR CONTENT			
	TEMPERATURE			
	COMP. STRENGTH			

AC PAVING	GRADATION	1 PER PLACEMENT, PER DAY AND EVERY 700 TONS THEREAFTER.	BEHIND PAVER & PRIOR TO COMPACTION	REPORT-24 HRS VERBAL-TIME OF TEST OR OBSERVATION
	CONTENT			
	COMPACTION/DENSITY	1 PER 5000 S.F.	AFTER FINAL ROLL	
	VISUAL	OBSERVE & DOCUMENT DEPTH, AGGREGATE SIZE, VOIDS IN AGGREGATE, OIL POOLING, ETC. VERIFY BATCH TICKET MIX DESIGN & PROJECT	DURING PLACEMENT	
<p>CONTRACTOR IS RESPONSIBLE FOR ALL COSTS INCURRED FOR RETESTS, REINSPECTIONS, REPLACEMENT OF NON-CONFORMING PRODUCTS. OWNER EMPLOYED SPECIAL INSPECTION VERIFICATION AND TESTING IS IN ADDITION TO THE CONTRACTOR'S QUALITY CONTROL TESTING. SPECIAL INSPECTION IN NO WAY DIMINISHES OR REDUCES THE CONTRACTOR'S QUALITY CONTROL OBLIGATIONS.</p>				

1.06 CONTROL

A. Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least two phases of control shall be conducted by the CQC Manager for each definable feature of work as follows:

1. Preparatory Phase: This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved, and after copies are at the work site. This phase shall include:
 - a. A review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by the Owner until final acceptance of the work.
 - b. A review of the contract drawings.
 - c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
 - d. Review of provisions that have been made to provide required control inspection and testing.
 - e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
 - f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
 - g. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Documentation of construction tolerances and workmanship standards for that feature of work.
 - h. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Project Manager.
 - i. Discussion of the initial control phase.
 - j. The Owner shall be notified at least 48 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC Manager and attended by the Superintendent, other CQC personnel (as

applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

2. Follow-up Phase: Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted, and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

1.07 TESTS

- A. Testing Procedure: The Contractor shall provide inspections, tests, and similar quality control services, specified in individual Specification Sections, and required by governing authorities, (Costs for these services shall be included in the Contract Sum). Upon request, the Contractor shall furnish to the Owner duplicate samples of test specimens for possible testing by the Owner. Testing includes operation and/or acceptance tests when specified. The Contractor shall perform the following activities and record and provide the following data:
 1. Verify that testing procedures comply with contract requirements.
 2. Verify that facilities and testing equipment are available and comply with testing standards.
 3. Check test instrument calibration data against certified standards.
 4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
 5. Results of all tests taken, both passing and failing, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Project Manager, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Project Manager. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.
- B. Retesting: The Contractor is responsible for retesting where results of required inspections, tests, or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.
- C. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:

1. Providing access to the Work, approved plans, and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
 2. Providing facilities for storage of all special inspection reports at the Project site and make available for review by the authorities having jurisdiction.
 3. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
 4. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
 5. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
 6. Security and protection of samples and test equipment at the Project site.
- D. Correction of Work: The Contractor shall bear all costs of correcting all Work identified as defective or as failing to conform to the Contract Documents, including any additional Owner Inspection Costs, and additional compensation for the Architect's and/or Project Manager's additional services made necessary thereby.
- E. Qualification for Laboratory Agencies: Engage inspection and testing service agencies, including independent testing laboratories free of conflict on interests with the General Contractor, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and testing to be performed.
1. Each independent inspection and testing agency engaged on the Project shall be authorized by the authorities having jurisdiction to operate in the State of Alaska and the Municipality of Anchorage.
 2. The Owner reserves the right to direct the specific location or area of work to be tested in accordance with contract requirements.

1.08 SPECIAL INSPECTIONS

- A. The Owner will provide Special Inspections, tests, and similar quality control services as identified in Section 01420, "Special Inspections". Costs for the Special Inspection services are not included in the Contract Sum.
- B. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Specification Sections shall cooperate with the Owner's Representative and Contractor in performance of its duties and shall provide qualified personnel to perform required inspections and tests.
1. The agency shall notify the Project Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
 3. Special Inspection agency shall not perform any duties of the Contractor, nor be under contract to perform testing services required of the Contractor.
- C. Coordination: The Contractor and each agency engaged to perform inspections, tests, and similar services shall coordinate the sequence of activities to accommodate required services. In addition, the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

2. The Contractor shall notify the Owner's Special Inspectors in writing 72 hours prior to required special inspection and coordinate with these inspectors so there are no additional project costs, schedule impacts or delays. The Contractor shall also be responsible to coordinate with the special inspectors and the Owner to identify on the construction schedule when these inspections shall occur.

1.09 WORKMANSHIP

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Perform work by persons qualified to produce workmanship of specified quality.
- C. Secure products in place in positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.10 MANUFACTURER'S INSTRUCTIONS

- A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from the Project Manager before proceeding.

1.11 MANUFACTURER'S FIELD SERVICE

- A. When required by individual Specifications Section, submit manufacturer's certificate, signed by responsible officer of the Manufacturer, that products meet or exceed specified requirements.
- B. When required by manufacturer, have manufacturer provide qualified representative to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable. Manufacturer Field Representative shall make a written report of observations and recommendations to the Project Manager.

1.12 SAMPLE PANELS AND MOCK-UPS

- A. Sample panels and/or mock-ups shall be used to establish uniform level of workmanship and finish color and texture. Accepted sample or mock-up shall serve as minimum standard of quality for subsequent work.
- B. Work on any Section requiring a sample panel or mock-up shall be approved in writing by the Owner.
- C. Sample panels or mock-ups may be requested by the Owner even though not specifically required of Specification Section to clarify level of workmanship, color, or texture.
- D. Tests shall be performed in accordance with Section 01410 and this section.

1.13 OBSERVATION

The following stages of construction specifically require observation by the Architect, Owner, and other Authorities having jurisdiction. Provide the indicated notice to the Project Manager prior to commencing work on the phase or upon completion as appropriate:

- A. Stages that require two-day notice include:

1. Completion of utility trench excavation prior to placement of bedding.
2. Completion of utility pipe installation prior to backfill.
3. Completion of subdrain system's drainage mat and perforated pipe prior to backfill.
4. Completion of driveway, parking lot and sidewalk excavation, installation of geotextile fabric and backfill prior to placement of pavement.
5. Completion of asphalt concrete pavement placement.
6. Completion of portland cement concrete pavement placement.
7. Completion of building excavation, geotextile fabric installation, and backfill prior to placement of concrete floor slab.
8. Completion of excavation forming prior to concrete placement.
9. Completion of concrete masonry, as damp-proofing work is beginning.
10. Wall framing and sheathing completed, observation of shear wall fastening and connections.
11. Mechanical and electrical rough-in and wall blocking, prior to cover.
12. Insulation and vapor barrier installation prior to cover, observation required as work progresses, notify as phases are complete.
13. Completion of mock-ups and finishes as mock-ups and areas are completed.
14. Prior to beginning roofing.

B. Stages that require five-day notice include:

1. Substantial Completion.
2. Operational instructions.
3. Final Completion.

1.14 COMPLETION INSPECTION

- A. Punch-Out Inspection: Near the end of the work, or any increment of the work established by a time stated in the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by Section 01400, paragraph 1.15 A.4. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Owner that the facility is ready for the Owner Substantial inspection.
- B. Final Inspection: The Contractor's Quality Control Inspection personnel shall be in attendance at the final inspection.

1.15 DOCUMENTATION

- A. The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:
1. Contractor/Subcontractor and area of responsibility.
 2. Operating equipment with hours worked, idle, or down for repair.
 3. Work performed each day, giving location, description, and by whom.
 4. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified. List of deficiencies noted, along with corrective action.
 5. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawing requirements.

6. Offsite surveillance activities, including actions taken.
 7. Instructions given/received and conflicts in plans and/or specifications.
 8. Any other remarks impacting quality control.
 9. Contractor's verification statement.
- B. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Owner on a weekly basis within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. Reports shall be signed and dated by the CQC Manager. The report from the CQC Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

1.16 NOTIFICATION OF NONCOMPLIANCE

- A. The Project Manager will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Project Manager may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

TESTING LABORATORY SERVICES

PART 1. GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Contractor will employ and pay for the services of an independent testing laboratory, free of conflict of interests with the General Contractor, to perform specified testing.
- B. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the work of the contract.
- C. Inspection, sampling and testing required as called for in the following technical sections.
- D. The Contractor shall pay for re-inspections and re-testing required because of defective work or ill-timed notices.

1.02 RELATED REQUIREMENTS

- A. Article 7.7, Section 00700 - General Conditions of the Contract for Construction.
- B. Inspections and testing required by laws, ordinances, rules, regulations, orders, project Contract Documents, or approvals of public authorities.
- C. Certification of Products: Respective Sections of Specifications.
- D. Test, Adjust, and Balance of Equipment: Respective Sections of Specifications.
- E. Each Specification Section Listed: Laboratory test required, and standards for testing.

1.03 QUALIFICATIONS OF LABORATORY

- A. Independent laboratory acceptable to Owner, Architect and Building Official.
- B. Meet "Recommended Requirements for Independent Laboratory Qualification" latest edition, published by American Council of Independent Laboratories, 1300 "I" Street N.W., Washington, D.C. 20005.
- C. Meet ASTM E-329 latest edition, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as used in Construction."

1.04 LABORATORY'S DUTIES

- A. Laboratory authorized to operate in Alaska, with a full-time engineer registered in Alaska on staff to review services.
- B. Ascertain and certify compliance with Contract Documents.
- C. Promptly submit, unless otherwise indicated, written Inspection and Test Report to each of the following within forty-eight hours of inspection:
 - 1. Owner: Two (2) copies
 - 2. Architect: Two (2) copies
 - 3. Contractor: Two (2) copies or as required

D. Include the following on Test Reports:

1. Date issued.
2. Project title and location.
3. Testing Laboratory name and address.
4. Inspector's name.
5. Date of inspection or sampling.
6. Record of temperature and weather.
7. Date of test.
8. Identification of product tested.
9. Test location in Project.
10. Type of inspection or test.
11. Observations regarding compliance with Contract Documents.

E. Laboratory is not authorized to:

1. Release, revoke, alter, or enlarge on Contract Document requirements.
2. Approve or accept any portion of work.
3. Assume any duties of Contractor.
4. Stop Work.

1.05 CONTRACTOR'S DUTIES

- A. Cooperate with laboratory personnel, provide access to work, and to Manufacturer's operations.
- B. Secure and deliver to the laboratory adequate quantities of representation samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.
- D. Furnish copies of products test reports as required.
- E. Furnish incidental labor and facilities:
 1. To provide access to work to be tested.
 2. To obtain and handle samples at the project site or at the source of the project to be tested.
 3. To facilitate inspections and tests.
 4. For storage and curing of test samples.
- F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests. Twenty-four hour minimum notification.
 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.
- G. Notify Architect and Owner a minimum twenty-four hours in advance of any testing.
- H. Repair test holes to match original conditions.
- I. Quality Control is the responsibility of the General Contractor. The General Contractor should employ a testing firm to provide testing as required to monitor and maintain his own quality control program, as well as satisfy the specific requirements of the Contract Documents.

1.06 OWNER'S TESTING LABORATORY SERVICES

- A. The Owner may also employ and pay for the services of an Independent Testing Laboratory to perform specified testing as indicated in the Supplementary General Conditions and in this section. This testing service will be employed for Quality Assurance Only. QUALITY CONTROL IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.
- B. The Contractor shall cooperate with the Owner's laboratory to facilitate the execution of its services.
- C. A copy of the Owner's laboratory written report of each test will be distributed to the Contractor.
- D. When initial tests indicate work does not comply with the Contract Document, all additional tests required, until tests pass, shall be at the expense of the Contractor.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

SPECIAL INSPECTIONS

PART 1. GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Purpose
- B. Types of Work
- C. Owner Responsibilities
- D. Engineer or Architect of Record Responsibilities
- E. Contractor Responsibilities
- F. Special Inspector Responsibilities

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division - 1 Specification Sections, apply to this Section.
 - 1. Section 00700 - General Conditions and Section 00800 – Supplemental Conditions of the Construction Contract.
 - 2. Section 01090 - Reference Specifications and Standards
 - 3. Section 01300 - Submittals
 - 4. Section 01400 - Quality Control Services

1.03 REFERENCES

- A. International Building Code (IBC) - SECTION 1704 - SPECIAL INSPECTIONS
- B. Uniform Administrative Code (UAC) - SECTION 306 - SPECIAL INSPECTIONS

1.04 PURPOSE OF SPECIAL INSPECTIONS

- A. In accordance with IBC Section 1704.1 General "In addition to the inspections required by Section 109, the owner or the engineer or architect of record acting as the Owner's agent shall employ one or more special inspectors who shall provide inspections during construction on the types of work listed under 1704."

1.05 TYPES OF WORK

- A. Except as provided in IBC Section 1704, the types of work listed below shall be inspected by a Special Inspector.
 - 1. Concrete.
 - 2. Bolts installed in concrete.
 - 3. Reinforcing steel in concrete.
 - 4. Structural welding.
 - 5. High-strength bolting.
 - 6. Structural masonry.
 - 7. Spray-applied fireproofing.
 - 8. Special grading, excavation, and filling.

- B. Continuous and Periodic Special Inspection and Approved Fabricators shall be a part of the Special Inspection requirements.

1.06 OWNER RESPONSIBILITIES

- A. The Owner or the Engineer or Architect of Record acting as the Owner's agent shall employ one or more Special Inspectors who shall provide inspections during construction on the types of work listed.
- B. The Owner shall be responsible for providing a full set of drawings and specifications to each Special Inspector.

1.07 ENGINEER OR ARCHITECT OF RECORD

- A. The Engineer or Architect of Record, under the Owner's direction, may be required to employ one or more Special Inspectors who shall provide inspections during construction on the types of work listed under IBC Section 1704.
- B. The Engineer or Architect of Record, under the Owner's direction, may be responsible for coordinating the Pre-Construction Meeting, with the Contractor, to include Special Inspectors for the purpose of reviewing the Special Inspection Program and responsibilities of each member.
- C. The Engineer or Architect of Record is responsible for clearly indicating the design parameters and material selection on the project plans and/or specifications.
- D. The Engineer or Architect of Record shall determine when and where Special Inspection is necessary in order to meet requirements of the Code.
- E. It shall be the responsibility of the Architect or Engineer of Record to prepare a typewritten Special Inspection Program for submittal to the Building Official for review and approval (UAC 302.5). Such approval shall be obtained prior to issuance of a Building Permit.
- F. Design changes required to correct non-conforming work already incorporated into the completed construction, shall be identified to the Building Official for review and approval as a Change Order. Such Changes shall be generated by the Engineer or Architect of Record.

1.08 CONTRACTOR RESPONSIBILITIES

- A. The Contractor shall be responsible for calling a Pre-Construction meeting to review Special Inspection requirements as they pertain to the project. Attendees shall include the Contractor's Construction Supervisor, ASD Project Manager, the Engineer or Architect of Record, the Building Safety Division Inspector assigned to the project, all Special Inspectors, and any subcontractors who will actually be constructing items requiring Special Inspection. This meeting shall not be considered a substitute for any pre-construction meeting held between the Contractor and the Owner and Engineer or Architect of Record although they may coincide.
- B. The Contractor shall be responsible for notifying the Special Inspector or special inspection firm regarding required special inspections. Notice shall be a minimum of 24 hours in advance.
- C. The Contractor shall have on site at all times, an approved set of plans and construction documents available to the Special Inspector for the purpose of reference or clarification.
- D. The Contractor shall be responsible for retaining, on site, a copy of all Special Inspection records submitted by the Special Inspector.

1.09 SPECIAL INSPECTOR RESPONSIBILITIES

- A. The Special Inspector shall observe the work assigned for conformance with the approved design drawings and specifications.
- B. Special Inspectors requiring certification by an agency such as ICBO, ACI, or AWS shall carry current certification with them while performing the Work on site.
- C. The Special Inspector shall remain on site at all times when work requiring Special Inspection is in progress.
- D. The Special Inspector shall immediately bring all nonconforming items of work or material to the immediate attention of the Contractor for correction.
- E. The Special Inspector or Inspection Firm shall submit required written reports to the Building Official (two copies), the Owner, and the Engineer or Architect of Record within 48 hours of inspection.
- F. Special Inspectors or Inspection Firms shall submit a final signed report to the Building Safety Division stating that all items requiring Special Inspection were, to the best of their knowledge, in conformance with the approved design drawings, specifications, approved change orders and the applicable workmanship provided in the International Building Code. Items not in conformance, unresolved items, and any discrepancies in inspection coverage shall be specifically itemized in the final report.
- G. Special Inspectors shall meet all certification requirements stated in the Special Inspection Program and required by the Municipality of Anchorage Building Safety Division and shall maintain certification at all times throughout the project.

END OF SECTION

STRUCTURAL OBSERVATION

PART 1. GENERAL

1.01 REQUIREMENT INCLUDED

- A. Purpose
- B. Types of Work
- C. Owner Responsibilities
- D. Engineer or Architect of Record Responsibilities
- E. Contractor Responsibilities
- F. Structural Observer Responsibilities

1.02 REFERENCES

- A. International Building Code (IBC)–Section 1709 STRUCTURAL OBSERVATION.

1.03 PURPOSE OF STRUCTURAL OBSERVATION

- A. In accordance with IBC Section 1709, the purpose of Structural Observation is as defined in IBC Section 1702.1: Visual observation of the structural system, for general conformance to the approved plans and specifications, at significant construction stages and at completion of structural system. Structural Observation does not include or waive the responsibility for the inspections required by other sections of the IBC.

1.04 TYPES OF WORK

- A. The Design Structural Engineer or another engineer designated by the Design Structural engineer shall perform Structural Observation.
- B. Observed deficiencies shall be reported in writing to the Owner's Representative, Special Inspector, Contractor, and the Building Official.
- C. The Structural Observer shall submit to the Building Official a written statement that the site visits have been made and identifying any reported deficiencies that, to the best of the Structural Observer's knowledge, have not been resolved.

1.05 OWNER'S RESPONSIBILITIES

- A. The Owner or the Engineer or Architect of Record acting as the Owner's Agent shall employ one or more Structural Observers who shall provide structural observation during construction on the types of work identified under IBC Section 1709.

1.06 ENGINEER OR ARCHITECT OF RECORD

- A. The Engineer or Architect of Record, under the Owner's direction, may be required to employ one or more Structural Observers who shall provide inspections during construction on the types of work defined under IBC Section 1709.

- B. The Engineer or Architect of Record, under the Owner's direction, with the Structural Observer, will review with the Contractor the Structural Observer Program and responsibilities of each member.
- C. The Engineer or Architect of Record is responsible for clearly indicating the design parameters and material selection on the project plans and/or specifications.
- D. The Engineer or Architect of Record shall determine when and where Structural Observation is necessary in order to meet requirements of the Code.
- E. Design changes required to correct non-conforming work already incorporated into the completed construction, shall be identified to the Building Official for review and formal approval. Such changes shall be generated by the Engineer or Architect of Record.

1.07 CONTRACTOR RESPONSIBILITIES

- A. The Contractor shall be responsible for calling a Structural Observation Organizational meeting to review the Structural Observation requirements as they pertain to the project. Attendees shall include the Contractor's Construction Supervisor, ASD Project Manager, the Engineer or Architect of Record, the Building Safety Division Inspector assigned to the project, all Structural Observers, and any subcontractors who will actually be constructing items requiring Structural Observation. This meeting shall not be considered a substitute for any pre-construction meeting held between the Contractor and the Owner and Engineer or Architect of Record although they may coincide.
- B. The Contractor shall have on site at all times, an approved set of plans and construction documents available to the Structural Observer for the purpose of reference or clarification.
- C. The Contractor shall be responsible for retaining, on site, a copy of all Structural Observation records submitted by the Structural Observer.

1.08 STRUCTURAL OBSERVER RESPONSIBILITIES

- A. The Structural Observer shall observe the work assigned for conformance with the approved design drawings and specifications.
- B. The Structural Observer shall remain on site at all times when work requiring Structural Observation is in progress.
- C. The Structural Observer shall immediately bring all nonconforming items of work or material to the immediate attention of the Contractor for correction.
- D. The Structural Observer shall submit required written reports to the Building Official (two copies), the Owner, and the Engineer or Architect of Record within 48 hours of inspection.
- E. The Structural Observers shall submit a final signed report to the Building Safety Division stating that all items requiring Structural Observation were, to the best of their knowledge, in conformance with the approved design drawings, specifications, approved change orders and the applicable workmanship provided in the International Building Code. Items not in conformance, unresolved items, and any discrepancies in inspection coverage shall be specifically itemized in the final report.

END OF SECTION

TEMPORARY FACILITIES AND CONTROLS

PART 1. GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

- A. Definitions: Specific administrative and procedural minimum actions are specified in this section as extensions of provision in General Conditions and other Contract Documents. These requirements have been included for special purposes as indicated. Nothing in this section is intended to limit types and amounts of temporary work required, and no omission from this section will be recognized as an indication that such temporary activity is not required for successful completion of the work and compliance with requirements of Contract Documents. Provisions of this section are applicable to, but not by way of limitation, utility services, construction facilities, support facilities, and security-protection provisions.

1.02 QUALITY ASSURANCE

- A. In addition to compliance with governing regulations and rules/recommendations of utility companies, comply with specific requirements indicated and with applicable local codes and industry standards for construction work.

1.03 JOB CONDITIONS

- A. General: Establish and initiate use of each temporary facility at time first reasonably required for proper performance of the work. Terminate use and remove facilities at earliest reasonable time, when no longer needed or when permanent facilities have, with authorized use, replaced the need.
- B. Conditions of Use: Install, operate, maintain, and protect temporary facilities in a manner and at locations which will be safe, non-hazardous, sanitary, and protective of persons and property, and free of deleterious effects.
- C. Pay all costs for such general services and temporary facilities, except as otherwise specified, until final acceptance of the work and/or Owner's beneficial occupancy of completed portions of the work.

PART 2. PRODUCTS

2.01 MATERIALS

- A. Materials may be new or used but must be suitable and adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.
- B. A new electrical utility drop and new transformer will be installed by local electric utility and is not a part of the scope of work. Permanent electrical service and distribution from the new transformer is required and made a part of Scope of Work to be complete for Substantial Completion.

PART 3. EXECUTION

3.01 TEMPORARY FACILITIES

A. Field Offices

Provide and maintain Contractors field office at the job site.

1. Construction shanties, sheds, and temporary facilities provided as required above shall be maintained in good condition and neat appearance.

B. Staging Area

1. All Contractor's storage, staging, field fabrication and field office operations shall be confined to the staging area shown on drawings.
2. Staging area shall be kept clean and orderly.

C. Sanitary Facilities

1. Provide and maintain temporary sanitary toilets in number required, location directed, and types approved by the regulatory authorities.

D. Electricity

1. Make all arrangements and pay for temporary electrical service to the construction area. Provide all equipment necessary for temporary power and lighting, and pay all charges for this equipment, and the installation thereof. Verify that electrical service is of adequate capacity for all construction tools and equipment without overloading the facilities.
2. Provide power distribution as required throughout for construction operations of all trades. The termination of power distribution shall be at convenient locations in the building. Terminations shall be provided for each voltage supply complete with circuit breakers, disconnect switches, and other electrical devices as required to protect the power supply system.
3. A temporary lighting system shall be furnished, installed and maintained as required to satisfy minimum requirements of safety and security. The temporary lighting system shall afford general illumination in all building areas and shall supply no less than 1-watt per square foot of floor area for illumination in the areas of the building where work is being performed.
4. All temporary equipment and wiring for power and lighting shall be in accordance with the applicable provisions of the governing codes. All temporary wiring shall be maintained in a safe manner and utilized so as not to constitute a hazard to persons or property.
5. When permanent electrical power and lighting systems are in operating condition they may be used for temporary power and lighting for construction purposes, provided that Contractor assumes full responsibility for the entire power and lighting systems and pays for power consumption until final acceptance or beneficial occupancy, whichever is first.
6. At the completion of the construction work all temporary wiring, lighting and other temporary electrical equipment devices shall be removed.

- E. Heating, Cooling and Ventilation: Furnish by approved methods, temporary heat including fuel and power as required to protect materials and work from dampness and cold and to dry out the facility. New permanent heating system may be used for this purpose; however, such use shall not relieve Contractor of Guarantee responsibilities. Refer to individual

sections for temperatures to be maintained for the work of the various trades. If the permanent heating is used for temporary heat, ducts shall be completely cleaned of dust and dirt and all filters replaced if "throw-away" type or cleaned if permanent type prior to occupancy.

F. Water Service

1. Provide all water necessary for construction purposes.
2. Furnish drinking water with suitable containers and cups for use of employees. Drinking water dispensers shall be conveniently located in the building where work is in progress.

3.02 TEMPORARY CONTROLS

A. Access Provisions

1. Provide ramps, stairs, ladders, and similar temporary access elements as reasonably required to perform the work and facilitate its inspection during installation. Comply with reasonable requests of governing authorities performing inspections.

B. Environmental Control

1. Provide and maintain all fences, barricades, lights, shoring and other protective structures or devices necessary for the safety of workmen, equipment, the public and property as required by state or municipal laws and regulations, and local ordinances, laws and other requirements of the municipality, state, and other authorities having jurisdiction with regard to safety precautions, dust control, and fire hazards.

C. Security and Protection Provisions.

1. The types of temporary security and protection provisions required include, but not by way of limitation, fire protection, personnel security program (theft prevention), and similar provisions intended to minimize property losses, personal injuries, and claims for damages at project site throughout construction period.
2. Building Enclosure and Lock-up: At earliest possible date secure building against unauthorized entrance at times when personnel are not working. Provide secure temporary enclosures at ground floor and other locations of possible entry, with locked entrances.
3. Fire Extinguishers: Provide types, sizes, numbers, and locations as would be reasonably effective in extinguishing fires during early stages by personnel at project site. Provide Type ABC dry chemical extinguishers; comply with recommendations of NFPA 10. Post warning and instructions at each extinguisher location, and instruct all personnel at project site, at time of their first arrival, on proper use of extinguishers and other available facilities at project site. Post local fire department call number on each telephone at project site.
4. Before beginning any work that may result in a fire alarm transmission, the contractor shall call both the Anchorage Fire Department dispatcher at 522-1122 and the local fire station which would respond to an alarm and let them know you will be working on the system and for approximately how long. Second, the contractor shall call Guardian Security at 274-5275 and notify the dispatcher that you have called the Fire Department, what type of work you are planning to do, and approximately how long before you expect to be completed. After the

contractor is completed with your work, you must reverse the process by notifying the Fire Department dispatcher and the ASD Dispatcher that you are finished.

D. Traffic

1. Conduct operations and the removal of debris to ensure minimum interference with adjacent occupied facilities.
2. Do not close or obstruct other occupied facilities without required permission. Provide alternate and safe routes around closed or obstructed traffic ways if required.
3. Whenever Contractor's operations affect public vehicular or pedestrian traffic, Contractor shall be responsible for installation and maintenance of any and all traffic control devices as seemed necessary by authority having jurisdiction.
4. Reference also Section 01502, "Maintenance of Traffic", for additional information and requirements.

3.03 TEMPORARY EQUIPMENT

A. Protective Headgear:

1. Provide for visitor's use six (6) new adjustable OSHA-approved hard hats.

3.04 REMOVAL

- A. Maintain all temporary facilities and controls as long as needed for safe and proper completion of Work. Remove all such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by Project Manager. Clean and repair damage caused by temporary installations or use of temporary facilities. Restore existing facilities used for temporary services to specified or original condition.

END OF SECTION

MAINTENANCE OF TRAFFIC

PART 1. GENERAL

1.01 DESCRIPTION OF WORK

- A. When working adjacent to school playgrounds, provide flagmen. Payment for such flagging and protective flagmen services shall be borne by Contractor.
- B. Contractor shall retain responsibility for traffic operations and protective measures to assure safe flow of traffic. Contractor shall cooperate with Owner so that traffic flow is minimally impeded by execution of work under this Contract.

1.02 SUBMITTALS

- A. Prior to starting any work, Contractor shall submit to the Authority having Jurisdiction and the Project Manager, detailed plan of his proposed method for controlling traffic at each affected location. Proposed traffic control plan shall show and describe proposed locations and time durations covering the following:
 - 1. Vehicular traffic routing including School Buses.
 - 2. Traffic blockage anticipated to be caused by work under this contract.
 - 3. Address conflicts between Pedestrian and vehicular traffic.

1.03 TRAFFIC MAINTENANCE FACILITIES

- A. Other than as shown on approved traffic control plans, at no time shall Contractor's operations interfere with safe and orderly operation of school. Encroachment by Contractor's operations will not be permitted.
- B. For duration of Contract, Contractor shall immediately repair or replace any and all appurtenances damaged or destroyed in performance of work included herein.
- C. Upon completion of work, temporary traffic maintenance items furnished by Contractor shall remain his property and shall be removed from site by Contractor.
- D. Contractor shall utilize dust control methods to control dust on access streets and project site to satisfaction of the Project Manager.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

PROJECT SIGN

PART 1. GENERAL

1.01 DESCRIPTION OF WORK

- A. Furnish, install, and maintain project identification sign.
- B. Project sign must be approved and permitted, prior to erections. Allow no other signs to be displayed.

1.02 PROJECT IDENTIFICATION

- A. Painted sign of 32 sf. area with painted graphic content to include:
 - 1. Title of project
 - 2. Name of Owner.
 - 3. Names of professional consultants
 - 4. Prime contractor.
 - 5. Major subcontractors.
 - 6. An area 18" square for Owner logo.
- B. Graphic design, style of lettering, and colors: As shown in this section.
- C. Erect on the site at a lighted location of high public visibility as approved by Project Manager.

1.03 QUALITY ASSURANCE

- A. Sign Painter: Professional experience in type of work required.
- B. Finishes, Painting: Adequate to resist weathering and fading during scheduled construction period.

PART 2. PRODUCTS

2.01 SIGN MATERIALS

- A. Structure and Framing: may be new or used, wood or metal, in sound condition structurally adequate to work and suitable for specified finish.
- B. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints. Thickness as required by standards to span framing members, to provide even, smooth surface without waves or buckles.
- C. Rough Hardware: Galvanized.
- D. Paint: Exterior quality semi-gloss Alkyd, as specified in painting specification.
- E. Vinyl Lettering and Graphics may be considered upon submittal to Project Manager.

PART 3. EXECUTION

3.01 PROJECT SIGN

- A. Paint exposed surfaces of supports, framing, and surface material; one coat of primer and one coat of exterior paint.
- B. Paint graphics in styles, sizes and colors selected.

3.02 MAINTENANCE

- A. Maintain sign and supports in a neat, clean condition; repair damages to structure, framing or sign.

3.03 REMOVAL

- A. Remove sign, framing, supports, and foundations at completion of the project.



END OF SECTION

MATERIALS AND EQUIPMENT

PART 1. GENERAL

1.01 DESCRIPTION

- A. Materials and Equipment incorporated into Work shall:
 - 1. Conform to applicable specifications and standards.
 - 2. Comply with size, make, type, and quantity specified, unless otherwise approved in writing.
- B. Manufactured and Fabricated Products:
 - 1. Manufacture like parts of duplicate units to standard size and gauges, and to be interchangeable.
 - 2. Two or more items of same kind shall be identical, and by same Manufacturer.
 - 3. Products shall be suitable for service conditions.
 - 4. Equipment shall comply with capacity, sizes, and dimensions shown or specified, unless otherwise approved in writing.
- C. Do not use materials or equipment for any purpose other than that for which designed or specified.

1.02 RELATED REQUIREMENTS

- A. Section 01010: Summary of Work
- B. Section 01340: Shop Drawing, Product Data and Samples.
- C. Section 01630: Substitution and Product Option
- D. Section 01710: Cleaning

1.03 CONTRACTOR'S OPTIONS

- A. For products specified only by reference standard, select any product meeting standard.
- B. For products specified by naming several products, select any of such products.
- C. For products specified by naming one or more products and "or approved", select any one specified product or submit request for substitution as specified.

1.04 INAPPROPRIATE PRODUCTS AND METHODS

- A. If Contractor believes that any specified product, method, or system is inappropriate for use, he shall, if possible, so notify the Project Manager at least ten (10) working days prior to bid opening, and if not possible, such notice shall be given before performing work in question. If notice of objection is not received within the specified time limits, it will be assumed that Contractor agrees that specified products, methods, and systems are not inappropriate for use.
- B. No asbestos containing materials are to be incorporated into the project. Certification signed by the General Contractor shall state that Asbestos Containing materials have not been installed under this project. Turn certification in to Project Manager no later than first payment application submittal. Recertify to Owner at substantial completion inspection.

1.05 PRODUCT SUBSTITUTIONS

- A. Refer to Section 01630.

1.06 NUMBER OF PRODUCTS REQUIRED

- A. Whenever in specifications a product is referred to in singular number, such reference shall include as many such products as are shown on Drawings are required to complete the Work.

1.07 PRODUCTS LIST

- A. Submit to Project Manager complete list of major products proposed for use; Specification Section, include proprietary product name, manufacturer's name, and installing Subcontractor's name in accordance with requirement of Section 01340 Shop Drawing, Product Data and Samples.

1.08 MANUFACTURER'S INSTRUCTIONS

- A. Perform work in accordance with Manufacturer's instructions.
- B. Do not omit preparatory or installation procedures required by Manufacturer, unless specifically modified by Contractor Documents.
- C. When Contract Documents require Work to comply with Manufacturer's instruction, obtain and distribute such instructions to parties performing work, including copies to Architect and Project Manager. Maintain one set at job site during installation and until acceptance.
- D. Handle, install, connect, clean, condition, and adjust products in strict accord with such instructions and in conformance with specified requirements.
- E. Should job conditions or specified requirements conflict with Manufacturer's instructions, consult Project Manager for further instructions.
- F. Do not proceed with work without clear instructions.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

DELIVERY, STORAGE, AND HANDLING

PART 1. GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide for expeditious transportation and delivery of products to project site undamaged, on schedule to avoid delay of the Work.
- B. Providing equipment and personnel at site to unload and handle products in manner to avoid damage to products.
- C. Provide secure storage and protection for products to be incorporated into the Work, and maintenance and protection for products after installation and until completion of the Work.

1.02 DELIVERY

- A. Arrange deliveries of products in accord with construction schedules and in ample time to facilitate inspection prior to installation.
- B. Coordinate deliveries to avoid conflict with work and conditions at site. Contractor deliveries must not conflict with:
 - 1. Work of other Contractors, or Owner.
 - 2. Limitations of storage space.
 - 3. Availability of equipment and personnel for handling products.
 - 4. Owner's use of premises.
- C. Deliver products in undamaged condition in original containers or packaging, with identifying labels intact and legible.
- D. Partial deliveries of component parts of equipment shall be clearly marked to identify equipment, to permit easy accumulation of parts and to facilitate assembly.
- E. Immediately upon delivery, inspect shipment to assure:
 - 1. Product complies with requirements of contract documents and reviewed submittals.
 - 2. Quantities are correct.
 - 3. Containers and packages are intact, labels are legible.
 - 4. Products are protected and undamaged. Minor damages may be repaired, provided finish items are equivalent in all respects to new work.

1.03 PRODUCT HANDLING

- A. Provide equipment and personnel necessary to handle products, including those provided by Owner, by methods to prevent soiling or damage to products or packaging.
- B. Provide additional protection during handling as necessary to prevent scraping, marring, or otherwise damaging products or surrounding surfaces.
- C. Handle products by methods to prevent bending or over-stressing.
- D. Lift heavy components only at designated lifting points.

1.04 STORAGE

- A. Store products immediately on delivery and protect until installed in the Work. Store in accord with manufacturer's instructions, with seals and labels intact and legible.
- B. Store products subject to damage by elements in substantial weather-tight enclosures.
 - 1. Maintain temperatures with ranges required by manufacturer's instructions.
 - 2. Provide humidity control for sensitive products, as required by manufacturer's instructions.
 - 3. Store unpacked products on shelves, in bins, or in neat piles, accessible for inspection.
- C. Exterior Storage
 - 1. Provide substantial platforms, blocking, or skids to support fabricated products 4" above ground, prevent soiling or staining.
 - 2. Cover products, subject to discoloration or deterioration from exposure to elements, with impervious sheet coverings. Avoid use of non-vented plastic or canvas shelters which could create humidity chambers. Provide adequate ventilation to avoid condensation.
 - 3. Store loose granular materials in solid surfaces such as paved areas or provide plywood or sheet materials to prevent mixing with foreign matter.
 - a. Provide surface drainage to prevent flow or ponding of rainwater.
 - b. Prevent mixing of refuse or chemically injurious materials or liquids.
 - 4. Provide exterior storage area within Contractor Secure area.
- D. Arrange storage in manner to provide easy access for inspection.

1.05 MAINTENANCE OF STORAGE

- A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:
 - 1. State of storage facilities is adequate to provide required conditions.
 - 2. Required environmental conditions are maintained on continuing basis.
 - 3. Surfaces of products exposed to elements are not adversely affected. Any weathering of products, coatings, and finishes is not acceptable under requirements of contract documents.
- B. Mechanical and electrical equipment which requires servicing during long-term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.

1.06 PROTECTION AFTER INSTALLATION

- A. Provide protection of installed products to prevent damage from subsequent operations, usage or vandalism. Remove when no longer needed, prior to completion of work.
- B. Control traffic to prevent damage to equipment and surfaces.
- C. Provide coverings to protect finished surfaces from damage.
 - 1. Cover projections, wall corners, jambs, sills, and soffits of openings, in areas used for traffic and for passage of products in subsequent work.
 - 2. Protect finished floors and stairs from dirt and damage.
 - a. In areas subject to foot traffic, secure heavy paper, sheet goods, and other

materials in place.

- b. For movement of heavy products, lay planking or similar materials in place.
- c. For storage of product, lay tight wood sheathing in place.

D. Waterproofed and Roofing Surfaces

- 1. Prohibit use of surface for traffic and any kind, or for storage of any products.
- 2. When some activity must take place in order to carry out Contract, obtain recommendations from installer for protection of surface.
 - a. Install recommended protection, remove on completion of that activity.
 - b. Restrict use of adjacent unprotected areas.

1.07 DAMAGED PRODUCTS

- A. Remove damaged or deteriorated materials from the premises. Replace materials which have been damaged.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

SUBSTITUTION AND PRODUCT OPTION

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. Contractor's options in selection of products.
- B. Requests for substitution of products.

1.03 RELATED REQUIREMENTS

- A. Section 00100 - Instruction to Bidders.
- B. Section 00700 and 00800 - General Conditions and Supplementary General Conditions.
- C. Section 01340 - Shop Drawings, Product Data and Samples.

1.04 CONTRACTOR'S OPTIONS

- A. Reference to any equipment, material, article, or patented process by trade name, make or catalog number shall be regarded as establishing a standard of quality and characteristics of products that will be satisfactory and shall not be construed as limiting competition.
- B. Whether or not specifically named equipment or material is followed by the term "equivalent" or "equivalent product" or "approved equal", it shall not exclude other manufacturer's equipment or materials from consideration, unless "NO SUBSTITUTIONS" called out in the specification sections. In this usage, the terms "equivalent" and "equal" or "approved equal" are interchangeable though a product or method considered for substitution may be equivalent to a specified product or method without actually being equal, by virtue of performance, appearance, and meeting specified or implied criteria.
- C. No item will be considered for substitution prior to the bid opening. Consequently, the Bidder shall make its own determination if a substituted item will be equivalent to or better than that specified or indicated in regard to quality, workmanship, finish, space requirements, electrical requirements, performance and guarantees or warranties. Any change in bid and/or contract amount due to any subsequent rejection of product found "not equivalent" will not be considered.
- D. After the Notice to Proceed the Contractor shall submit sufficient data in accordance with this Section to establish equality. The Owner's Representative shall be the sole judge of equality and acceptability.
- E. Acceptance of substitute materials will not relieve the Contractor of the responsibility for any changes in the Contractor's own work or in the work of other trades caused by the substitution. Any additional costs resulting from substitutions are the responsibility of the Contractor.

1.05 SUBSTITUTION PROCEDURE

- A. Requests for substitutions of products will be considered only within 90 calendar days after Notice to Proceed. Subsequent requests will be considered only when judged to be in the best interest of the Owner.
- B. Substitutions will not be considered when indicated on shop drawings or product data submittals without separate formal request, when requested directly by subcontractor or

supplier, or when acceptance will require substantial revision of Contract Documents.

- C. Substitute products shall not be ordered or delivered without written acceptance.
- D. Submit separate request for each substitution. Document each request with complete data substantiating compliance of proposed substitution with requirements of Contract Documents.
- E. Identify products by specifications section and article numbers. Provide manufacturer's name and address, trade name of product, and model or catalog number. List fabricators and suppliers as appropriate.
- F. Attach product data as specified in Section 01340 and the following:
 - 1. Give itemized comparison of proposed substitution with specified product and listing variations.
 - 2. Give quality and performance comparison between proposed substitution and specified product.
 - 3. List availability of maintenance services and replacement materials.
 - 4. State effect of substitution on construction schedule, and changes required in other work or products.
- G. If no requests for substitutions have been received within time frame stated above, it will be assumed that construction will proceed with equipment, materials and products called for in Contract Documents.

If this is subsequently found not to be the case, the Owner reserves the right to demand that unapproved item be removed and replaced with specified item.

1.06 CONTRACTOR REPRESENTATION

- A. Request for substitution constitutes a representation that Contractor has investigated proposed product and has determined that it is equal to or superior in all respects to specified product.
- B. Contractor shall provide same warranty or bonds for substitution as for specified product.
- C. Contractor shall coordinate installation of accepted substitute, making such changes as may be required for work to be complete in all respects, specifically including any related redesign costs.
- D. Contractor waives claims for additional cost caused by substitution which may subsequently become apparent.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

(Except for "Substitution Request Form," 1 page)

SUBSTITUTION REQUEST FORM

TO: _____

PROJECT: _____

We hereby submit for your consideration the following product instead of the specified item for the above project:

Section _____ Page _____ Paragraph _____ Specified Item _____

Proposed Substitution: _____

Attach complete Product description, drawings, photographs, performance and test data, and other information necessary for evaluation.

Will changes be required to building design in order to properly install proposed substitution?
Yes ___ No ___ If Yes, explain: (Add second sheet).

Will the undersigned pay for changes to the building design, including engineering and drawing costs, caused by requested substitution? Yes ___ No ___.

What differences exist between proposed substitution and specified item?

Does substitution affect Drawing dimension? Yes ___ No ___ If Yes, explain: (Add second sheet.)

What affect does substitution have on other trades?

Does Manufacturer's warranty of proposed substitution differ from that specified?
Yes ___ No ___ If Yes, explain: (Add second sheet.)

Will substitution affect Progress Schedule? Yes ___ No ___ If Yes, explain: (Add second sheet.)

Will substitution cost more than specified Product? Yes ___ No ___ If Yes, explain: (Add second sheet.)

Do substitutions affect the Commissioning process and checklists included in Division 17? Yes ___
No ___ If any, attach a marked-up copy of the appropriate Checklist(s) from Division 17 for Owner's approval.

Will maintenance and service parts be locally available for substitution? Yes ___ No ___ If Yes, explain: (Add second sheet.)

Submitted by:

Signature: _____

Firm: _____

Address: _____

City: _____

Date: _____

For Owner's Representative's Use Only:

Accepted () Accepted as Noted ()
Not Accepted () Received Too Late ()

By: _____

Date: _____

Remarks: _____

Phone: _____

STARTING OF SYSTEMS

PART 1. PART GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

- A. Starting systems.
- B. Demonstration and instructions.
- C. Testing, adjusting, and balancing.

1.03 RELATED SECTIONS

- A. Section 01730 - Operation and Maintenance Data.

1.04 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

1.05 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. In a classroom environment located at the Project site, demonstrate, and provide instruction for the Project equipment by a manufacturer's representative who is knowledgeable about the Project.
- C. For equipment or systems requiring seasonal operation, perform demonstrations for other seasons within nine months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual

with Owner's personnel in detail to explain all aspects of operation and maintenance.

- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

1.06 TESTING, ADJUSTING, AND BALANCING

- A. The independent firm will perform services specified in Section 01410 and 01651.
- B. Reports will be submitted by the independent firm to the Owner indicating observations and results of tests and indicating compliance or non-compliance with the requirements of the Contract Documents.

PART 2. PART PRODUCTS (NOT USED)

PART 3. PART EXECUTION (NOT USED)

END OF SECTION

SYSTEM COMMISSIONING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of contract, including General and Supplementary Conditions and other Divisions of these Specifications, apply to work of this section.

1.02 DEFINITION

- A. Building Commissioning work is a joint team effort to ensure that all equipment and systems have been completely and properly installed and put into services. The commissioning work will begin only after all systems are 100% complete and functional. The factory start-up of all equipment must have been carried out as well as control system completion and start-up and balancing. The team is made up of representatives from the owner's Engineer and Contractor's organizations.

- B. The Contractor shall schedule system commissioning. The trades represented during the commissioning include sheet metal, piping and fitting, refrigeration, controls and balancing. The lead tradesmen for each trade who actually performed the work is to be present. All trades are to be present as scheduled during the commissioning session. The balancing and control contractors may be released when their portions of work have been completed. The Contractor will submit a schedule of activities for commissioning at least 30 days prior to beginning commissioning. A suggested schedule outline is as follows:

1. Day One (Monday) Owner and Engineer; Mechanical Contractor optional.
2. Day Two (Tuesday) Owner, Engineer, Balancing Contractor, Control Contractor and Mechanical Contractor.
3. Day Three (Wednesday) Owner, Engineer, Balancing Contractor, Control Contractor, Mechanical Contractor including Sheet Metal Contractor and Fitter.
4. Day Four (Thursday) Owner, Engineer, Mechanical Contractor, Sheet Metal Contractor, Fitter and Refrigeration Contractor.
5. Day Five (Friday) Refrigeration Contractor and all parties from day four to complete tasks not completed previously.

1.03 DOCUMENTS

- A. The following documents shall be assembled and bound into the operating and maintenance manuals and delivered according to Section 01730, Maintenance Data.

1. Plumbing sanitization certified.
2. Certificates of Completion from the following Contractors:
 - a. Sheet Metal
 - b. Plumbing and Piping
 - c. Automatic Temperature Control
 - d. Refrigeration
 - e. Fire Protection
3. Balancing report including duct pressure test.
4. Boiler startup certificate, including stack gas test.
5. Hydronic system water analysis report.
6. Steam boiler water analysis report.
7. All operating and maintenance data as described in Section 01730.

- B. Record Drawings will be submitted to District according to Section 01700, Contract

Closeout.

1.04 SCOPE OF WORK

- A. The work included under this section includes a complete and thorough investigation of all systems in order to ensure proper installation and operation of all components and systems. The following systems will be evaluated:
1. Automatic temperature controls.
 2. Instrumentation (gauges, thermometers, etc.)
 3. Air handling equipment.
 4. Air Distribution and exhaust systems.
 5. Boilers.
 6. Hydronic heating and steam distribution systems.
 7. Refrigeration equipment.
 8. Fire protection.
 9. Labeling, marking and color coding.

PART II - PRODUCTS

2.01 VALVE TAGS

- A. Tag all valves with round, numbered, brass tags. Fasten to valve stem with beaded chain. In boiler room and fan room provide a framed, typewritten directory under glass. Directory shall list all valve tag numbers, service of valve, system valve is located in, location of valve and whether valve is normally open or closed. Provide a separate tag sequence for each service. Each service prefix to be abbreviation used for that service (sprinkles, S-1, S-2, etc.; Air, A-1, A-2, etc.)

2.02 EQUIPMENT LABELS

- A. Label all equipment with heat resistant, laminated plastic labels having engraved lettering 1/2-inch high and fastened in place with rivets, screws or pressure sensitive, double sided tape, on back of label. Examples "Pump P-1," "Water Heater No. 1," "Exhaust Fan Ref-2," Air Handling Unit AHU-1," etc.

2.03 PIPING LABELS

- A. Label all service piping with adhesive backed, flexible, vinyl labels, sealed in clear polyester film. Secure labels with directional flow adhesive vinyl banding tape. Labels and tape to comply with ANSI A13.1-1982 for color and size.
- B. Manufacturer: Baker, Emed, Setmark, Seton.

2.04 WATER TREATMENT CHEMICALS

- A. Obtain the services of a professional water treatment firm for testing the steam boiler water and prescribing the treatment chemicals.
- B. Provide a one-year supply of treatment chemicals to maintain the boiler water at or below the following conditions.
1. Neutralized specific conductance.
 2. Total alkalinity 600 ppm.
 3. Suspended solids 250 ppm.
 4. Silica 90 ppm.

The treatment will include a filming amine additive for protection of the condensate piping.

- C. Supply materials are to be based on boiler operation of 10 hours per week at 50% to 100% of capacity with 50% of condensate being returned to system.

PART III - EXECUTION

3.01 SYSTEM COMMISSIONING

- A. The following procedures will be verified during the commissioning process. All procedures are to be checked and carried out by the contractor prior to commissioning.

3.02 PRELIMINARY WALK THROUGH

- A. A preliminary walk through to provide a visual check of the various systems to verify that all components are properly installed. The following items will be observed.
- B. Air Distribution:
 - 1. Mounting and support of equipment.
 - 2. Noise, vibration, air and water leaks.
 - 3. Air filtration, presence of dampers, diffusers, grilles, fire dampers and access doors.
 - 4. Presence of thermostats and other adjustable temperature control devices.
 - 5. Presence of smoke sensors and other safety devices.
 - 6. Instrumentation, gauges, thermometers, flow measuring devices.
 - 7. Hoods and exhaust systems.
- C. Plumbing and Piping Systems:
 - 1. Mounting support of equipment.
 - 2. Noise, vibration and leaks.
 - 3. Strainers, valves fixtures and instrumentation and flow measuring or control.
- D. Heating and Cooling Equipment:
 - 1. General installation and service access.
 - 2. Proper cycling.
 - 3. Excessive noise, vibration or leads.
 - 4. Fuel storage, distribution instrumentation and filtration.
 - 5. Presence of safety devices and controls.
- E. Refrigeration Systems:
 - 1. Compressor operation and lubrication.
 - 2. Unit cooler operation.
 - 3. Cooling fluid flow and control.
 - 4. Temperature maintenance and instrumentation.
 - 5. Vibration, excessive noise and leaks.
- F. Fire Protection System:
 - 1. General installation and compliance with approved shop drawings and design drawings.
 - 2. Head locations.
 - 3. Proper functioning of alarms.
 - 4. NFPA certification - Chapter 13.
 - 5. Locate spare heads, wrench and NFPA 13A manual.

- G. Any discrepancies or deficiencies are to be noted for further investigation during the detailed evaluation.
- H. Verify that all cleaning has been completed.
- I. Verify that all touch-up painting has been completed.

3.03 DETAILED EVALUATION

- A. Air distribution systems:
 - 1. Spot checks of approximately 10% of air outlets will be made. Engineer will select outlets and air balancer will demonstrate a reading of that outlet. Where appropriate, the thermostat will be adjusted to simulate full cooling, full heating, hood operation, etc.
 - 2. Air balancer will demonstrate total air flow at each air handler at simulated full cooling and/or maximum fresh air.
 - 3. Air balancer will demonstrate proper air flow at each fume hood, based on previously marked sash positions.
 - 4. Air balancer will demonstrate proper air flow at each process hood.
 - 5. Demonstrate proper room static pressure with respect to adjacent space(s).
 - 6. Motor HP draw will be demonstrated at selected fan motors.
 - 7. Discrepancies between balancing report and spot check results will be dealt with to correct any deficiencies. In the event that significant deficiencies are detected, the entire balancing procedures may be required to be repeated.
 - 8. Any noted drafts or noisy air distribution devices will be evaluated and corrective action taken.
 - 9. Any balancing related problems identified during the Preliminary Walk Through will be addressed and corrected.
- B. Heat Transfer and Hydronic Systems:
 - 1. Contractor will demonstrate that strainers have been cleaned by team observation of approximately 5 strainers selected by the Engineer. If significant debris is found in selected strainers, all strainers will be cleaned.
 - 2. Balancer will demonstrate fluid flows at approximately 10% of flow control devices.
 - 3. Selected pumps will have amp draws demonstrated.
 - 4. Fluid temperatures and pressures will be observed at each system, and compared with design values.
 - 5. Glycol concentration will be measured for compliance with design specifications.
 - 6. Any noted deficiencies between the sample evaluations and the balancing report will be dealt with to correct any deficiencies. In the event that significant deficiencies are detected, the entire balancing procedures may be required to be repeated.
 - 7. Any balancing related problems identified during the Preliminary Walk Through will be addressed and corrected.
- C. HVAC Control Systems:
 - 1. The Control Contractor will demonstrate the proper function of each control system, and instruct Owner's operating personnel in the proper operation of the systems. The balancing contractor will be present to correct flows and assist in fine tuning system.
 - 2. Control Contractor will demonstrate the proper functioning of the following devices:
 - a. Each thermostat to adequately control heating and cooling.
 - b. Each automatic damper and valve.
 - c. Fresh air and return air dampers.
 - d. Economizer operation.

- e. Boiler, chiller and pump starting and stopping from program control.
 - f. Exhaust fan and air handler start and stop.
 - g. Variable air volume control of VAV air handlers, and tracking of associated return fan.
 - h. Variable air volume control of VAV exhaust fans
 - i. Freeze prevention control.
3. Control Contractor will point out proper labeling of each control device.
 4. Control Contractor and Balancing Contractor will coordinate efforts as required until all functions of air distribution and hydronic systems have been fully demonstrated and have been accepted by the District and the Engineer.
- D. Sheet Metal Contractor will demonstrate the following:
1. Proper voltage, overload heater size and rotation of each motor driven fan or air handling device.
 2. Proper belt tension and drive alignment.
 3. Proper clearance and deflection of spring isolation of fans and drives.
 4. Proper installation of flexible connections.
 5. Sealing of all ductwork per specification.
 6. Complete insulation of ductwork and plenums and sound attenuation where required.
 7. Completion of any deficiencies pointed out during balancing and control system commissioning.
 8. Marking and labeling of each air handling device.
 9. Proper shutdown of air handling systems in the event of presence of smoke or products of combustion.
 10. Monitor bearings for heat buildup or noise.
 11. Demonstrate that heating and cooling coil fins are straight.
 12. Demonstrate operation and maintenance of humidification equipment.
 13. Sheet Metal Contractor will correct any deficiencies noted during Preliminary Walk Through and Detailed Evaluation.
 14. Correct any deficiencies discovered during Preliminary Walk Through and Detailed Investigation.
- E. Each Contractor will explain any special features or intricacies of system operation to the building operating personnel. Items covered should include safety features, hazards to be aware of, precautions to be observed to avoid damage to equipment and any necessary seasonal adjustments which are required. Generally discuss service frequency of devices such as bearings, belt drives, filters, strainers, etc. Show maintenance and operating personnel where additional information can be found in the Operating and Maintenance Manuals.
- F. Plumbing and Piping Contractor will demonstrate and explain the following:
1. The cleaning, degreasing and flushing of piping systems.
 2. The proper filling of hydronic and chilled water systems.
 3. Proper glycol concentration and Ph of hydronic and chilled water systems.
 4. Piping and valve marking.
 5. Equipment labeling.
 6. Demonstrate proper operation of fuel supply system.
 7. Demonstrate proper operation of sewage lift pump.
 8. Demonstrate proper operation of sump pumps.
 9. Tour facility and demonstrate proper installation and operation of plumbing fixtures and piping systems.
 10. Demonstrate and explain chemical feed equipment.
 11. Demonstrate operation of air compressor, deionized water equipment and other process equipment.

12. Correct any deficiencies discovered during Preliminary Walk through and Detailed Investigation.
- G. Refrigeration Contractor will instruct equipment operators and demonstrate and explain the following:
1. Proper charging and lubrication of each refrigeration system.
 2. Vibration isolation of equipment.
 3. Proper piping insulation.
 4. Adequate air flow at cold diffusers.
 5. Proper connection of piping.
 6. Proper coolant flow and temperature.
 7. Defrost of cold diffusers.
 8. Maintenance of required temperature in cold boxes.
 9. Proper maintenance and cleaning.
 10. Labeling of equipment and control devices.
 11. Verify proper voltage, rotation and overload heater sizing.
 12. Correct any deficiencies noted during Preliminary Walk Through and Detailed Investigation.

3.04 CERTIFICATION

- A. The following certificate will be signed by each trade listed, indicating that all commissioning work has been completed and that all systems are installed according to the contract documents and manufacturer's installation instructions. The Contractors further certify that all adjustment, lubrication, alignment and startup procedures have been carried out.
- B. Individual Contractor Certifications: (see next page)

CERTIFICATE OF COMPLETION

(Building) _____

(Address) _____

- 1. Mechanical Contractor _____
(firm)

(signature) _____ (title) _____ (date)
- 2. Sheet Metal _____
(firm)

(signature) _____ (title) _____ (date)
- 3. Plumbing _____
(firm)

(signature) _____ (title) _____ (date)
- 4. Fitting _____
(firm)

(signature) _____ (title) _____ (date)
- 5. Balancing _____
(firm)

(signature) _____ (title) _____ (date)
- 6. Controls _____
(firm)

(signature) _____ (title) _____ (date)
- 7. Refrigeration _____
(firm)

(signature) _____ (title) _____ (date)
- 8. Insulation _____
(firm)

(signature) _____ (title) _____ (date)
- 9. Fire Protection _____
(firm)

(signature) _____ (title) _____ (date)

- 10. Refrigeration _____
(firm)

(signature) (title) (date)
- 11. Refrigeration _____
(firm)

(signature) (title) (date)
- 12. Refrigeration _____
(firm)

(signature) (title) (date)

The engineer of record has observed the commissioning process and acknowledges that it was carried out according to the contract documents.

(firm) (date)

(signature)

The District has observed the commissioning and acknowledges that it was carried out to his satisfaction. The District acknowledges receipt of the following documents and services:

- 1. Operating and Maintenance Manuals
- 2. As-built Drawings
- 3. All Certificates
- 4. Operator Instruction

(organization) (date)

(signature) (title) (date)

3.05 SYSTEM WARRANTY

- A. The one-year warranty period which begins with beneficial use of the systems is the responsibility of the Contractor. It is the Contractor's responsibility to repair, adjust or replace any defective material and equipment during the warranty period. It is the Owner's responsibility to notify the Contractor of any deficiencies immediately.
- B. During the warranty period, the Owner and building operators should not make any system adjustments, alterations or repairs without first contacting the Contractor. Adjustment of room thermostats may be made at building occupant's discretion without first contacting the Contractor. The Contractor should be contacted as soon as possible so that a permanent repair can be carried out. The MAINTENANCE/ REPAIR REQUEST FORM (see example at the end of this section) should be used to report and document system malfunctions. Requests must be signed by building superintendent.
- C. Emergency repairs and adjustments may be made to prevent system or building components without first contacting the Contractor. Emergency procedures would include items such as repairing leaks, adjusting controls to prevent building freeze-up or other similar adjustments to prevent the building from becoming uninhabitable or unsafe.
- D. Maintenance procedures which are the responsibility of the building Owner during the warranty period include:
 - 1. Replacement of air filters.
 - 2. Replacement or repair of any items which are broken or damaged by building users.
 - 3. Replacement of water softener salt.
 - 4. Replacement (if required) acid neutralization marble.
 - 5. Cleaning of oil separators or grease traps.
- E. Maintenance / Repair Request:
 - 1. The form on the next page is to be used by the Owner and building occupants to document and report any malfunctions in mechanical systems.

MAINTENANCE / REPAIR REQUEST

Reported by _____ Phone (_____) _____ Date _____

Building Superintendent Signature _____

Describe Malfunction _____

Location (i.e. room number/above ceiling/etc.) _____

Describe any Temporary Adjustments or Repairs _____

What is the Urgency of Repair _____

Has this Been Reported by Telephone _____ to Whom _____

Name _____ Firm _____ Phone (____) _____

Date _____ Time _____ Action Promised _____

Repairs Made _____

by _____ Firm _____ Date _____

Contractor's Comments _____

Certification that repairs have been satisfactorily completed

(Building Superintendent) _____ Date _____ Time _____

Send one copy of this form to Contractor. Place one copy of this form in the Building Operating and Maintenance Manual under the appropriate tab.

END OF SECTION

PROJECT CLOSE-OUT

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

- A. Definitions: Close-out is hereby defined to include general requirements near the end of contract time, in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified in Sections of Division 2 through 28. Time of Close-out is directly related to "Substantial Completion".

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Section 00700 and 00800 General and Supplementary General Conditions
- B. Section 01750: Warranty of Work after Final Payment
- C. Section 01750: Certificate of Compliance

1.03 SUBSTANTIAL COMPLETION

- A. When Contractor considers work substantially complete as defined in contract conditions, he shall submit to the Project Manager:
 - 1. Written notice that work, or designated portion thereof, is substantially complete.
 - 2. List of items to be completed or corrected.
 - 3. Conditional Certificate of Occupancy from governing authorities.
 - 4. Project Records and Contract Record Drawings.
- B. Project Manager will at the mutually agreed time, make inspection to determine completion status.
 - 1. Should Project Manager determine that work is not substantially complete:
 - a. Project Manager will promptly notify Contractor, in writing, giving reasons therefore.
 - b. Contractor will remedy work deficiencies, and send second notice of substantial completion to Project Manager.
 - c. Project Manager will re-inspect work, with his cost and/or expense for such to be the Contractor's responsibility.
 - 2. When Project Manager concurs that work is substantially complete, the Architect will:
 - a. Prepare Certificate of Substantial Completion accompanied with Contractor's list of items to be completed or corrected, as verified and amended by the Project Manager and Architect.
 - b. Submit certificate to Owner and Contractor for their written acceptance of the responsibilities assigned to them in the certificate.

1.04 FINAL INSPECTION

- A. When Contractor considers work complete, he shall submit written certification that:
 - 1. Contract documents have been reviewed.
 - 2. Contractor has inspected work for compliance with contract documents.
 - 3. Work has been completed in accordance with contract documents.

4. Equipment and systems have been tested and operated in presence of Owner's representative and are operational.
 5. Copy of substantial completion punch lists stating that each item has been completed or otherwise resolved for acceptance.
- B. Project Manager will, at the mutually agreed time, inspect the work to verify completion status.
1. Should the Project Manager consider work incomplete or defective:
 - a. Project Manager will promptly notify Contractor in writing of any incomplete or defective work.
 - b. Contractor shall immediately remedy deficiencies, and send written certification to Project Manager that work is complete.
 - c. Project Manager will re-inspect work.
 2. When Project Manager finds the work acceptable under contract documents, he will request Contractor to make closeout submittals.

1.05 RE-INSPECTION FEES

- A. Should Project Manager and or Engineer be required to make more than one substantial and/or final inspection due to Contractor's failure to correct specified deficiencies, the Contractor shall bear all costs made necessary by such additional inspections.

1.06 SUBMITTALS

- A. Record Drawings
1. Prior to Final Completion of the Project, the Contractor and/or Subcontractors under his direction, shall submit records of changes on prints to Project Manager.
 2. Accompany submittal with transmittal letter, to Project Manager, containing:
 - a. Date
 - b. Project title and number
 - c. Contractor's name and address
 - d. Title and number of each record document
 - e. Certification that each document as submitted is complete and accurate.
 - f. Signature of Contractor, or his authorized representative.
 3. Provide drawings and special system drawings on CD in AutoCad format.
- B. Project Record Documents
- C. Operating and Maintenance Data
- D. Building Official's Certificate of Occupancy (MUST BE RECEIVED IN TIME TO ALLOW OCCUPANCY ON DATE REQUIRED IN CONTRACT DOCUMENTS).
- E. Warranty of Work after Final Payment Section 01750
- F. Certificate of Compliance Section 01750
- G. AHERA Exclusion document Section 01750
- H. Department of Revenue Tax Clearance Section 01750

- I. Department of Labor Tax Clearance Section 01750
- J. Department of Labor Notice of Completion of Public Works Section 01750
- K. Certificate of Domestic water disinfection.
- L. Evidence of Payments and Release of Liens
 - 1. Contractor's Affidavit of Payment of Debt and Claims.
 - 2. Contractor's Affidavit of Release of Liens including the following:
 - a. Consent of Contractor's Surety to Final Payment.
 - b. Contractor's Release of Waiver of Liens.
 - c. Separate releases of Waivers of Lien for each subcontractor, supplier, and others with lien rights against Owner's property.
- M. Storm Water Pollution Prevention Plan (SWPPP) and associated documents.
 - 1. A copy of the Notice of Intent (NOI) and the plan review location notice shall be posted in the project office on site.
 - 2. A copy of the SWPPP shall be retained in the project office during construction.
 - 3. All records relating to the SWPPP, as well as the Plan, the NOI, and NOT shall be retained by the Contractor and the Municipality of Anchorage for three years after the NOT is issued.
 - 4. Copies of all SWPPP documents are to be delivered to the Municipality of Anchorage and the Anchorage School District upon completion of the project and before final closeout.
- N. Closeout Checklist Section 01750
 - 1. A closeout checklist is provided for convenience in tracking the necessary documentation and deliverables for project closure. This checklist should be updated and submitted with each closeout deliverable.

1.07 FINAL APPLICATION FOR PAYMENT

- A. Follow procedures specified in General and Special Conditions, and also note miscellaneous prerequisites for final payment noted in this section.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

CLEANING

PART 1. - GENERAL

1.01 DESCRIPTION

- A. Execute cleaning, during progress of the work, and at completion of the work.

1.02 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2. - PRODUCTS

2.01 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.

PART 3. - EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute periodic cleaning to keep the work, the site, and adjacent areas free from accumulations of waste materials, rubbish, and debris, resulting from construction operations.
- B. Provide on-site containers for the collection of waste materials, debris, and rubbish.
- C. Remove waste materials, debris, and rubbish from the site periodically and dispose of.

3.02 DUST CONTROL

- A. Clean interior spaces prior to the start of finishing painting and continue cleaning on an as-needed basis until painting is finished.
- B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.

3.03 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.
- C. Prior to final completion, or Owner occupancy, the Contractor shall conduct an inspection of sight-exposed interior surfaces and all work areas to verify that the entire work is clean.

END OF SECTION

PROJECT RECORD DOCUMENTS

PART 1. - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Maintenance of record documents and samples.
- B. Submittal of record documents and samples.

1.02 RELATED REQUIREMENTS

- A. Document 00700 - General Conditions.
- B. Section 01300 - Submittals.
- C. Section 01340 - Shop drawings, Product data and Samples.
- D. Section 01700 - Project closeout.
- E. Individual Specifications Sections: Manufacturer's certificates and certificates of inspection.

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. In addition to requirements in General Conditions, maintain at the job site for Owner's use one record copy of:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data and samples.
 - 6. Field test records.
 - 7. Inspection certificates.
 - 8. Manufacturer's certificates.
 - 9. Request for Information (RFI)
 - 10. Request for Proposal (RFP)
 - 11. Current Construction Network.
- B. Store record documents and samples in the field office apart from the documents used for construction.
- C. Label and file record documents and samples in accordance with Section number listings in Table of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- D. Maintain record documents in a clean, dry and legible condition. Do not use record documents for construction purposes.

Keep record documents and samples available for inspection by the Project Manager.

1.04 RECORDING

- A. From the copies of Contract Documents to be furnished by Project Manager, the Contractor and/or Subcontractors shall record on a set of clean, new prints each and every change that is made, at time it is made, in red. This includes any changes that are made in partitions, doors, or otherwise in arrangement of construction of buildings as well as a complete record of exact manner in which electrical and mechanical work, piping, etc., are installed. All Change Orders, RFI's, and Information Bulletins shall be incorporated. Dimensions shall be included where necessary to accurately locate piping and other items that will be concealed underground or in finished building that may later be necessary to service.
- B. Contract Drawings: Legibly mark to record actual construction.
 - 1. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
 - 2. Field changes of dimensions and detail.
 - 3. Changes made by Change Order and other modifications.
 - 4. Details not on original contract drawings.
 - 5. References to related shop drawings and modifications.
- C. Shop Drawings: Maintain as record documents, legibly annotate appropriate drawings to record changes made after review.
- D. Specifications and Addenda: Legibly mark up each section to record:
 - 1. Changes made by Change Order.
 - 2. Manufacturer, trade name and catalog number of each product actually installed, particularly optional items and substitute items.
 - 3. Changes made by addenda and modifications.
 - 4. Other matters not originally specified.
- E. Label each document "PROJECT RECORD" in printed letters.
- F. Keep record documents current. No progress payments will be made until record documents are verified by the Project Manager as being current.
- G. Do not permanently conceal any work until required information has been recorded.
- H. Methodology:
 - 1. Changes to Work are described by source documents, including, but not limited to, Field Directives (FD), Information Bulletins (IB), Requests for Information (RFI), and Requests for Proposals (RFP), and their attachments. (Reference Section 00700, Article 12.)
 - 2. Project Record drawings are to completely and clearly reflect all Changes to Work by graphically showing actual changes to dimensions, locations, materials, assemblies, and other conditions; by graphically deleting conditions replaced by such changes; and by indicating applicable source document's reference number. Such reference number shall not be the sole representation of Changes to Work shown on Project Record drawings.
 - 3. Where A/E furnishes supplemental drawings, Project Record drawings are to show both the A/E's supplemental drawing reference number and the source document's reference number at the affected location.

1.05 SUBMITTAL

- A. Prior to Final Completion of the Project, the Contractor and/or Subcontractors under his direction, shall submit records of changes on prints to Project Manager.
- B. Accompany submittal with transmittal letter, to Project Manager, containing:
 - 1. Date
 - 2. Project title and number
 - 3. Contractor's name and address
 - 4. Title and number of each record document
 - 5. Certification that each document as submitted is complete and accurate.
 - 6. Signature of Contractor, or his authorized representative.

PART 2. - PRODUCTS (NOT USED)

PART 3. - EXECUTION (NOT USED)

END OF SECTION

OPERATING AND MAINTENANCE DATA

PART 1. GENERAL

1.01 SECTION INCLUDES

- A. Format and content of manuals.
- B. Instruction of Owner's personnel.
- C. Schedule of submittals.

1.02 RELATED SECTIONS

- A. Section 01300 - Submittals
- B. Section 01400 - Quality Control
- C. Section 01410 - Testing Laboratory Services
- D. Section 01420 - Special Inspections

- E. Section 01600 - Material and Equipment
- F. Section 01700 - Contract Closeout
- G. Section 01750 - Closeout Forms
- H. Individual Specifications Sections: Specific requirements for operation and maintenance data.

1.03 QUALITY ASSURANCE

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.04 FORMAT

- A. Prepare data in the form of an instructional manual.
- B. Electronic: Optical Character Recognition (OCR) formatted pdf document.
- C. Cover: Identify each pdf with a title "OPERATION AND MAINTENANCE INSTRUCTIONS"; identify title of Project; identify subject matter of contents.
- D. Provide bookmarked pdf for each separate product and system, with typed description of product and major component parts of equipment.
- E. Text: Manufacturer's printed or typewritten data.
- F. Drawings: Provide with O&M documents.
- G. Contents: Prepare a Table of Contents for each volume, with each Product or System description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions arranged by and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Photocopies of warranties and bonds.

1.05 CONTENTS, EACH VOLUME

- A. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer, Subconsultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
- B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01400.
- F. Warranties and Bonds: Bind in copy of each.

1.06 MANUAL FOR MATERIALS AND FINISHES

- A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. (Provide information for re-ordering custom manufactured Products.)

- B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional Requirements: As specified in individual Product specification sections.
- E. Provide a listing in Table of Contents for design data.

1.07 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- C. Include color coded wiring diagrams as installed.
- D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- E. Maintenance Requirements: Include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- F. Provide servicing and lubrication schedule, and list of lubricants required.
- G. Include manufacturer's printed operation and maintenance instructions.
- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide Contractor's coordination drawings, with color-coded piping diagrams as installed.
- L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- N. Include test and balancing reports as specified.
- O. Additional Requirements: As specified in individual Product specification sections.

- P. Provide a listing in Table of Contents for design data, with tabbed (fly sheet indexed) and space for insertion of data.

1.08 MANUALS

- A. Operating and Maintenance Manuals: Submit electronic manual for each identified category.
 - 1. Air Balance Report
 - 2. Building Commissioning Reports
 - 3. Materials and Finishes Manual
 - 4. Equipment and Systems Manual
 - 5. Digital and Pneumatic Controls Manual
 - 6. Fire Systems Manual
- B. Warranty and Special Warranty Manual: Submit electronic manuals.

1.09 INSTRUCTION OF OWNER PERSONNEL

- A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.
- B. For equipment requiring seasonal operation, provide instructions for all seasons
- C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.10 SUBMITTALS

- A. Submit copies of preliminary draft or proposed formats and outlines of contents before start of Work. Project Manager will review draft and return copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit advance copy of documents within ten days after acceptance. Include same information within final Operations and Maintenance documents.
- C. Submit draft copy of completed volumes 60 days following acceptance of Project Submittals. Allow 20 days for Architect review and return to Contractor. Provide Contractor resubmittal within 14 days. Allow 14 days for Architect review of resubmittal. Revise content of all document sets as required prior to final submission.
- D. Submit fully approved volumes within 115 days after acceptance of Submittals or 10 days prior to Substantial Completion, whichever occurs first.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION (NOT USED)

END OF SECTION

CLOSEOUT FORMS

PART 1. - GENERAL

- 1.01 The following forms are to be submitted by the Contractor prior to final project closeout.
- 1.02 CERTIFICATION OF SUBSTANTIAL COMPLETION
- A. Use Anchorage School District Form 101 attached herein.
- 1.03 CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS
- A. Use Anchorage School District Form 102 attached herein.
- 1.04 RELEASE ON CONTRACTS
- A. Use Anchorage School District Form 103 attached herein.
- 1.05 CONSENT OF SURETY COMPANY TO FINAL PAYMENT
- A. Use Anchorage School District Form 104 attached herein.
- 1.06 CONSENT OF SURETY TO REDUCTION IN OR PARTIAL RELEASE OF RETAINAGE
- A. Use Anchorage School District Form 105 attached herein.
- 1.07 CERTIFICATE OF COMPLIANCE
- A. The Contractor shall submit a notarized Certificate of Compliance, contained in this section, with his application for Final Payment.
- 1.08 WARRANTY OF WORK AFTER FINAL PAYMENT
- A. The Contractor shall furnish to the Owner a notarized Warranty of Work after Final Payment, contained in this section, with his application for Final Payment.
- 1.09 AHERA EXCLUSION DOCUMENT
- A. The Contractor shall furnish to the Owner a signed AHERA Exclusion Document, contained in this section, with his application for Final Payment.
- 1.10 DEPARTMENT OF LABOR NOTICE OF COMPLETION OF PUBLIC WORKS
- A. The Contractor shall furnish to the Owner a Notice of Completion of Public Works form approved by the Department of Labor with his application for Final Payment.
- 1.11 DEPARTMENT OF REVENUE TAX CLEARANCE REQUEST FORM
- A. For projects funded through the Department of Education (debt reimbursement or DEED grants), the Contractor shall furnish to the Owner a Tax Clearance Request Form approved by the Department of Revenue with his application for Final Payment.
- 1.12 DEPARTMENT OF LABOR TAX CLEARANCE REQUEST FORM
- A. For projects funded through the Department of Education (debt reimbursement or DEED

grants), the Contractor shall furnish to the Owner a Tax Clearance Request Form approved by the Department of Labor, with his application for Final Payment.

1.13 CLOSEOUT CHECKLIST

- A. The closeout checklist is designed to assist the contractor and project manager in the process of completing the project.

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project: _____ Contract Number: _____

Contractor: _____ Contract Date: _____

Architect: _____ Date of Issuance: _____

Owner: ANCHORAGE SCHOOL DISTRICT
1301 Labar Street
Anchorage, Alaska 99515

Project Description:

The work performed under this contract has been reviewed and found to be substantially complete. The date of Substantial Completion is hereby established as: _____

Definition of Date of Substantial Completion:

The date of substantial completion of the project is the date certified by the Owner when the work is substantially complete in accordance with, and defined in the Contract Documents.

A list of items to be completed or corrected, prepared by the Owner and verified and amended by the Architect is appended hereto. The failure to include any items or such list does not alter the responsibility of the Contractor to complete the project in accordance with the Contract Documents.

The Contractor will complete or correct the work on the list of items appended hereto within 30 days from the date of substantial completion.

The responsibilities of the Owner and the Contractor for maintenance, heat, utilities, and insurance shall be as follows: _____

In reliance upon the certification of the Contractor and the Architect, the Owner hereby accepts the project as substantially complete. In accordance with the Contract Documents, the Owner hereby elects to assume occupancy of _____

_____ at _____ a.m./p.m. on _____

Owner: ANCHORAGE SCHOOL DISTRICT

By: _____ Title: _____ Date: _____

Architect:

By: _____ Title: _____ Date: _____

Contractor:

By: _____ Title: _____ Date: _____

ASD 101 (01/03)

**CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS
ANCHORAGE SCHOOL DISTRICT**

WHEREAS, by the terms of a contract dated _____ entered into by the
Anchorage School District, and _____ for the construction of

The undersigned, pursuant to the General Conditions of the Contract for the construction,
_____, hereby certifies that, except as listed below, he has paid
in full or has otherwise satisfied all obligations for all materials and equipment furnished, for all work, labor, and services
performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in
connection with the performance of the Contract referenced above for which the District or his property might in any way
be held responsible.

EXCEPTIONS:

IN WITNESS WHEREOF, the seal of the undersigned Contractor have been hereunto set this
_____ day of

_____, at _____

By _____

_____ being first duly sworn, say that I am the agent for and executed
the foregoing under authority of said company to do so; that I have read the same, know the contents thereof, and the
matters set forth therein are as I truly believe.

By _____

Subscribed and sworn to before me this _____ day of _____
_____, at _____

Notary Public in and for _____
My Commission Expires _____

**RELEASE ON CONTRACT
ANCHORAGE SCHOOL DISTRICT**

WHEREAS, by the terms of a contract dated _____ entered into by the Anchorage School District,

and _____ for the construction of _____

_____, it is provided that:
"Neither the final payment nor the remaining retained percentage shall become due until the Contractor shall provide the Owner (1) with a waiver and release of liens, on the forms provided by the Owner, executed by the Contractor..."

NOW THEREFORE, in consideration of the premises and the payment by the Anchorage School District to the undersigned Contractor of the amounts due under the contract and any changes or modifications thereto, to wit, the sum

of \$ _____ Dollars,

(Numbers)
(In Words)

the undersigned Contractor hereby releases and forever discharges the Anchorage School District including its property, particularly that real property known as:

_____ of the Anchorage School District, of and from all manner of debts, dues and sum or sums of money, accounts, claims, and demands whatsoever, in Law and in equity, under or by virtue of said contract, and warrants good title to all material, supplies and equipment installed or incorporated in the project and all work delivered to the premises, together with all improvements and appurtenances constructed thereon by:

_____ to the Anchorage School District free of any claims, liens or encumbrances. Neither the undersigned nor any person, firm or corporation furnishing material or labor for any work covered by this Contract has any right to a lien upon the premises nor improvement thereon, except:

_____.

IN WITNESS WHEREOF, the signature of the undersigned Contractor has been hereunto set this

_____ day of _____, 20__, at _____, Alaska.

Signature: _____

Printed Name: _____

I, _____, being first duly sworn, say that I am the agent for and executed the foregoing under authority of said company to do so; that I have read the same, know the contents thereof, and the matters set forth therein are as I truly believe.

Signature: _____

Subscribed and sworn to before me this _____ day of _____, 20__, at _____, Alaska.

Notary Public in and for _____

My Commission Expires: _____.

ASD Form 103

**CONSENT OF SURETY COMPANY
TO FINAL PAYMENT**

PROJECT: _____ **PROJECT NUMBER:** _____

TO: Anchorage School District **CONTRACT DATE:** _____

CONTRACTOR: _____

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above:

(Surety Company)

on bond of

(Contractor)

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety Company of any of its obligations to **Anchorage School District, Owner** as set forth in said Surety Company's bond. Surety expressly agrees that any and all valid claims of sub-Contractors and all persons supplying labor or materials to the project will be satisfied by Contractor or Surety in a timely manner.

IN WITNESS WHEREOF, the Surety Company has hereunto set its hand this

day of _____, 20_.

Name of Surety Company

Attest

Signature of Authorized Representative

Title

ASD 104

**CONSENT OF SURETY TO REDUCTION IN OR PARTIAL RELEASE OF RETAINAGE
ANCHORAGE SCHOOL DISTRICT**

PROJECT: _____ **PROJECT NUMBER:** _____
TO: Anchorage School District **CONTRACT DATE:** _____
CONTRACTOR: _____

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above,
the:

_____ (Surety Company)
on bond of
_____ (Contractor)

HEREBY APPROVES OF THE REDUCTION IN OR PARTIAL RELEASE OF RETAINAGE to the Contractor
as follows:

The surety agrees that such reduction in or partial release of retainage to the Contractor shall not relieve the
Surety of any of its obligations to **ANCHORAGE SCHOOL DISTRICT, OWNER**

IN WITNESS WHEREOF, the Surety Company has hereunto set its hand this
day of .

Name of Surety Company

Attest

Signature of Authorized Representative

Title

ASDF Form 105

CERTIFICATE OF COMPLIANCE

No final payment shall be made until the Contractor shall file with the Owner, prior to acceptance of the work, a notarized Certification of Compliance in the following form:

The Contractor does hereby certify that all work has been performed and materials supplied in accordance with the Drawings, Specifications and Contract Documents for the above work, and that:

No less than the prevailing rates of wages as ascertained by the governing body of the Contracting Agency has been paid to laborers, workmen and mechanics employed on this work;

There have been no unauthorized substitutions of Subcontractors; nor have any subcontracts been entered into without prior notice having been submitted to the Owner prior to the start of such subcontracted work;

No subcontract was assigned or transferred or performed by any Subcontractor other than the original Subcontractor, without prior notice having been submitted to the Owner together with the names of all Subcontractors;

All claims for material and labor and other paid service performed in connection with these specifications have been paid;

All monies due the State Industrial Accident Fund, the State Unemployment Compensation Trust Fund, the State Tax Commission, Hospital Associations and/or others have been paid.

In WITNESS WHEREOF, the undersigned has signed and sealed this instrument this

_____ day of _____, 20__.

(Firm Name)

(Signature)

(Title)

(Attest)

(SEAL IF BIDDER IS A CORPORATION)

As determined necessary, evidence of compliance may be required to be submitted with and made a part of this Certificate of Compliance.

WARRANTY OF WORK

Prior to Final Payment, the Contractor shall furnish to the Owner a Warranty of Work in the following form:

The Contractor does hereby warrant all work and materials to be in full and complete accordance with the Contract Documents and Agreement between Owner and Contractor, and requirements appertaining thereto; that all work and materials are free from any and all defects and imperfections, and fully suitable for the use and purposes for which each and every part is intended. The Contractor also agrees that, should any defect develop or appear which the Project Manager or Owner's Representative finds was Not caused by improper use, the Contractor shall promptly, upon demand, fully correct, substitute and make good any such defective material without any cost to the Owner and will save the Owner harmless against any claim, demand, loss or damage by reason of any breach of this warranty.

The period of this warranty shall commence on the date of Substantial Completion.

The warranty shall continue to be in full force and effect for the period of one (1) year, except for those items for which a longer period of warranty is specifically stated in the Warranties for work in Technical Sections of the Specifications.

Warranties for work stated in Technical Section shall continue in full force and effect for the respective periods expressly stated.

In WITNESS WHERE, the undersigned has signed and sealed this instrument this

_____ day of _____, 20____.

(Firm Name) _____

(Signature) _____

(Title) _____

(Attest) _____

(SEAL IF BIDDER IS A CORPORATION)

AHERA Exclusion Document

Contractor's Verification of Asbestos-Free Construction

Project: _____ Project Number: _____

Contractor: _____ Date: _____

To: Anchorage School District
Facilities Coordinator,
AHERA LEA Designated Person

To the best of our knowledge, no asbestos-containing building materials were installed in this project.

Attest: _____
Signature of Authorized Representative

Title

Department of Labor and Workforce Development
 Labor Standards and Safety Division
 Wage and Hour Administration
 www.labor.state.ak.us/lss/lss.htm



NOTICE OF COMPLETION OF PUBLIC WORKS

Additional Filing Fee May Be Required

- This form must be typed or printed in ink.
- Fill in all blanks or form will be returned for correction (see back).
- Please allow a minimum of 30 working days for processing.

ENTER YOUR FAX # _____
 AND LIST YOUR MAILING ADDRESS BELOW

Contractor, company or agency name, address, city, state & ZIP + 4

Project Name	Contract #	
Contract awarding agency		
Address		
City	State	ZIP + 4
Contract awarding agency contact person		Phone #
Location and city where work was performed		
DOLWD Project #		
Project Completion Date / /		

Primary contractor (has contract with the public agency)

IF YOU HAVE ALREADY PAID \$5,000 IN FEES FOR THIS PROJECT, OR IF YOU PREVIOUSLY PAID ALL FEES DUE AND DID NOT HAVE ANY INCREASES IN CONTRACT AMOUNTS ENTER "NONE" AND, SKIP TO CERTIFICATION. OTHERWISE, DESCRIBE ADDITIONAL WORK.

Description of additional contract/subcontract work performed	Name of contractor who performed this work	Amount of subcontract
CERTIFICATION: I hereby certify that the above information is correct. Enclosed is the additional filing fee computed at 1% of the total amount of all new contracts on this project, including the contract price of new work performed by the primary contractor not previously reported on the Notice of Work, up to a maximum of \$5,000. I also certify that all contractors who worked on this project complied with prevailing wage requirements as described in AS 36.05.010- .110 and AS 36.10.007- .990.	Total value of additional subcontracts	\$
	Additional value of work performed by primary contractor	+ \$
	Amount subject to fee	\$
	Multiply by .01	
Supplemental fee enclosed =		\$
ROUND FEES TO NEAREST DOLLAR		
For Dept. Use Only		
Amount: _____ Check Number: _____ Cash _____ Received By: _____ Date: _____ Credit Card Confirmation _____ Visa _____ MC _____ Project Name _____ DOLWD Project # _____		
Wage & Hour date-stamped copy of this form will serve as temporary receipt.		
Signature _____	Date _____	
Title _____		
Fax # _____	Phone # _____	
For Dept. Use Only		
T-36 Clearance Approved By _____ Department of Labor and Workforce Development		

How to expedite the processing of your form:

ERRORS THAT CAUSE REJECTION

No fee included or incorrect amount. If total contract amount is less than \$25,000 no filing fee is required. Contract amounts paid to owner/operators with no employees are exempt from the fee. **The maximum total filing fee for any one project is \$5,000.00.**

Missing - Value of work performed by primary contractor.

Missing – The name of each **NEW** subcontractor and the amount of the contract OR the name of existing subcontractors and the amount of any **NEW** work not previously reported on the Notice of Work.

Missing – Notice of Completion of Public Works must be signed by an authorized representative.

FILING INSTRUCTIONS

Additional fees are required for any increase in contract value, unless the maximum fee (\$5,000) has been paid.

If there is not enough space to list all required information on one form, use additional sheets. Please indicate at the top of each sheet “Page 1 of 2”, “Page 2 of 2”, etc. No other attachments will be accepted.

A Wage and Hour Administration (WH) date-stamped copy of this form will serve as a temporary receipt, while the acceptance of fees is processed. WH will mail or fax the approved copy of this form to the organization provided on the front of this form. Make a copy for your records. This will serve as your notice that the fees paid have been accepted by WH.

For questions call the nearest WH office:

Juneau: (907) 465-4842 Anchorage: (907) 269-4900 Fairbanks: (907) 451-2886

For more forms, see www.labor.state.ak.us/lss/lssforms.htm

Submit the notice and the appropriate filing fee to:

Alaska Department of Labor and Workforce Development
Wage and Hour Administration
3301 Eagle Street, Ste. 301
Anchorage, AK 99503-4149

If no fee is required, you may fax the notice to (907) 269-4915

**Alaska Department of Revenue
TAX CLEARANCE REQUEST FORM**

Applicant's Name: _____

EIN/SSN: _____

Mailing Address: _____

City/State/Zip Code: _____

I hereby authorize the Alaska Department of Revenue to release to

(Name of Department or Agency)

Department's Statute on tax clearance: _____

whose facsimile number or email address is _____.

confirmation that all taxes, penalties and interest due the Department of Revenue have been paid and that there are no outstanding amounts due.

Signed: _____

Printed Name: _____

Title*: _____

*If tax clearance is being requested on behalf of a corporation/LLC/partnership, must be signed by an officer/member/partner.

Send completed form by email to the Department of Revenue at DOR.tax.accounting@alaska.gov

<i>DEPARTMENT USE ONLY</i>	
<input type="checkbox"/>	<i>The above applicant is current on all taxes, penalties and interest due and is in good standing with the Alaska Department of Revenue.</i>
<input type="checkbox"/>	<i>The above applicant is not current on all taxes, penalties and interest due and is not in good standing with the Alaska Department of Revenue.</i>
_____ <i>Department of Revenue Representative</i>	_____ <i>Date</i>

*TaxClearanceRequestForm (Rev 2/21)



THE STATE of ALASKA GOVERNOR MICHAEL J. DUNLEAVY

Department of Labor and Workforce Development

Division of Employment and Training Services Employment Security Tax

P.O. Box 115509 Juneau, AK 99811-5509 Relay Alaska (in state): (800) 770-8973 or 7.1.1 Relay Alaska (out of state): (800) 770-8255 Toll free: (888) 448-2937 Phone: (907) 465-2787 Fax: (907) 465-2374

Tax Clearance Request Form for Contractors

Date of request: _____

Business name of the contractor a Tax Clearance is being requested for: _____

Business address: _____

Business contact phone number: _____

Federal Identification Number: _____

Alaska Employer Account Number: _____

Specific time period a tax clearance is being requested for (i.e. beginning and ending date of a subcontract agreement): _____

Subcontract project name: _____

Name and address of the person this Tax Clearance is to be returned to: _____

Comments or additional information: _____

For agency use only:

Tax Clearance is granted

Tax Clearance is not granted (please have employer contact the department)

No account on file, liability unknown (please have employer contact the department)

Employer has stated no employees, Tax Clearance not required.

Agency representative signature: _____ Date: _____

Agency representative title: _____

We are an equal opportunity employer/program. Auxiliary aids and services are available upon request to individuals with disabilities. labor.alaska.gov/estax

Rev. 8/2018

Project Title: _____

Project Number: _____

PROJECT CLOSEOUT CHECKLIST	Number Required	Number & Date Delivered
Inspection Documents		
Substantial Completion Inspection Documents	1	
Substantial Completion Punch List	1	
Final Inspection Documents	1	
Final Inspection Punch List	1	
Certificate of Substantial Completion (ASD Form 101)	1	
Contractor Submittals		
As-built drawings to Engineer of Record (Section 01700)	1	
All project record documents (Section 01720)	1	
Maintenance and Operations Manuals – Electronic version – OCR pdf (Section 01730)	1	
Warranty and Special Warranty Manuals (Section 01730)	4	
Certificate of Domestic Water Disinfection (Section 01700)	2	
Warranty of Work (Section 01750)	1	
Certificate of Compliance (Section 01750)	1	
Building Officials Certificate of Mechanical and Electrical Inspection	3	
Building Official's Certificate of Occupancy	3	
Building Official's Certificate of Completion	3	
AHERA Response Action Report (RAR)	1	
AHERA Exclusion Document (Section 00630)	1	
Return school keys to lock shop	1	
Lock Shop Release Form (signed)	1	

Project Title: _____

Project Number: _____

PROJECT CLOSEOUT CHECKLIST	Number Required	Number & Date Delivered
Contractor's Affidavit of Payment of Debts and Claims (ASD Form 102)	1	
Consent of Surety Company to Final Payment (ASD Form 104)	1	
Release on Contract (ASD Form 103)	1	
Consent of Surety to Reduction in/or Partial Release of Retainage (ASD Form 105)	1	
Engineered As-built drawings and special system drawings on reproducible CD's (not zipped)	1	
Engineered As-built drawings and special system drawings on bond/blacklines	2	
Spare Parts deliverables	1	
Copy of Warranty for all items with Extended Warranty	1	
Notice of Completion of Public Works (Section 00630) (Approved DOL Clearance Form)	1	
Dept. of Revenue Tax Clearance Form (Section 00630) (Approved DOR Tax Clearance Form)	1	
Dept. of Labor Tax Clearance Form (Section 00630) (Approved DOL Tax Clearance Form)	1	
Apprenticeship Program - Purchasing release for final payment (projects over \$100,000)		
Final Application and Certificate for Payment (ASD Form 100A-C)	1	
Base Access Pass(s) returned to Project Manager		NA

Project Manager Signature

Date

END OF SECTION

UTILITY LOCATION REQUIREMENTS

PART 1. - GENERAL

1.01 DESCRIPTION

- A. Upon receipt of written notification from any of public agencies or utilities that Contractor has caused damage to any facility, equipment or installation of agency, and Contractor failed to request a utility locate service from said utility at least two (2) normal business days prior to damage, or if locate services was properly requested, that damage was not approximately caused by error in locate service, Owner will withhold from forthcoming or accrued Contract payment, including advances, a sum sufficient to protect agency or utility from loss. Public agencies or utilities that provide notice of facility damage under this paragraph are:

Anchorage Water and Wastewater Utility
Alaska Communications Systems
Alaska Fiber Star
Alaska Native Medical Center
Alaska Railroad Corporation
Alyeska Cable / TelAlaska
Anchorage School District
Aircraft Service International Group
AT&T Alascom
Chugach Electric Association, Inc.
Department of Transportation Street Lights, State of Alaska
Enstar Natural Gas Company
Flint Hills Resources/Williams Alaska Pipeline
GCI Cable
Matanuska Electric Association
Matanuska Telephone Association
Municipality of Anchorage/Department of Public Works
Municipal Light & Power Utility
Tesoro Alaska Inc.

- B. Upon receipt of release of claim by notifying utility or upon judgment of a court having jurisdiction in matter and having established that Contractor is liable for a lesser amount or is not liable for damage, Owner will release excess funds to Contractor. Funds withheld pursuant to this provision shall not bear interest. Upon receipt of satisfactory evidence against Contractor in court of competent jurisdiction within sixty (60) days after discovery of damage, Owner shall release funds withheld pursuant to this provision.

1.02 PROTECTION OF UTILITIES

- A. Any pipes or other utilities encountered in excavation shall be shored up and cared for by Contractor as to leave them in a proper working condition until such times as Owner determines what shall be done with them.
- B. Any utilities mislocated or inadequately located by appropriate utility company which are damaged by Contractor shall not constitute reimbursement or time extensions to Contractor from Owner for repair(s) of work that Contractor performs.
- C. Contractor shall coordinate his work to cooperate with original utility service installed.

PART 2. - PRODUCTS (NOT USED)

PART 3. - EXECUTION (NOT USED)

END OF SECTION

HAZARDOUS MATERIALS ASSESSMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. The Hazardous Materials Assessment for the proposed construction is included with these Contract Documents.

1.2 USE OF INFORMATION

- A. The Hazardous Materials Assessment is provided for the Contractor's information and use in the planning and performance of work in areas containing hazardous or potentially hazardous materials as outlined in Paragraph 1.3.
 - 1. The information provided in the Hazardous Materials Assessment is based on samples collected in various locations of the building. Thus, the Owner and/or its Representative cannot guarantee or warrant that actual conditions encountered might not vary from the information presented in these reports.
 - 2. The data reported in the Hazardous Materials Assessment is accurate to the best of the Owner's and its Representative's knowledge. The requirements contained in these specifications and in the relevant state and federal regulations pertaining to the performance of work in areas containing hazardous or potentially hazardous materials provide guidance for the contractor for performance of work in these areas. The Owner and its Representative disclaim all responsibility for the Contractor's erroneous conclusions regarding the information presented in these reports; the requirements contained in these specifications; and the requirements of applicable state and federal regulations pertaining to performance of work in these areas.
 - 3. The Contractor shall be responsible for obtaining additional information if Contractor deems it necessary to carry out the work.
- B. It is highly recommended that the contractor visit the site to acquaint themselves with existing conditions.
- C. Attached Hazardous Materials Assessment.

1.3 HAZARDOUS MATERIALS NOTIFICATION:

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead, are also present in settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.
- B. Notification of Child Occupied Facility: Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

HAZARDOUS MATERIALS ASSESSMENT

BETTYE DAVIS EAST ANCHORAGE HIGH SCHOOL ACADEMIC AREA SAFETY IMPROVEMENTS

ANCHORAGE, ALASKA

Surveyed

October 28, 2020

April 24, 2021

August 3, 2023

Report Date

January 3, 2024

EHS-ALASKA, INC.

ENGINEERING, HEALTH & SAFETY CONSULTANTS

11901 BUSINESS BLVD., SUITE 208

EAGLE RIVER, ALASKA 99577-7701

**HAZARDOUS MATERIALS ASSESSMENT
BETTYE DAVIS EAST ANCHORAGE HIGH SCHOOL ACADEMIC AREA SAFETY IMPROVEMENTS**

ANCHORAGE, ALASKA

TABLE OF CONTENTS

	PAGE NO.
OVERVIEW	5
A. GENERALIZED REQUIREMENTS FOR HAZARDOUS MATERIALS	5
B. BUILDING DESCRIPTION	6
C. SAMPLING AND ANALYSIS	7
1. Asbestos-Containing Materials	7
2. Lead-Containing Materials	8
3. Suspect Fungal and Bacterial Growth	9
D. SURVEY RESULTS	9
1. Asbestos-Containing Materials	9
2. Dust Sampling for Asbestos	106
3. Lead-Containing Materials	109
4. Suspect Fungal and Bacterial Growth	112
5. PCB-Containing Materials	114
6. Mercury-Containing Materials	114
7. Other Hazardous Materials	115
E. REGULATORY CONSTRAINTS	115
1. Asbestos-Containing Materials	115
2. Dusts with Asbestos	116
3. Lead-Containing Materials	117
4. Suspect Fungal and Bacterial Growth	118
5. PCB-Containing Materials	119
6. Mercury-Containing Materials	119
7. Other Hazardous Materials	119
F. RECOMMENDATIONS	120
1. Asbestos-Containing Materials	120
2. Dusts with Asbestos	120
3. Lead-Containing Materials	120
4. Suspect Fungal and Bacterial growth	120
5. PCB-Containing Materials	121
6. Mercury-Containing Materials	121
6. Other Hazardous Materials	121
G. LIMITATIONS	121
1. Accuracy of Information	121
2. Site Conditions	122
3. Changing Regulatory Constraints	122

APPENDICES

Appendix A	Asbestos Bulk Field Survey Data Sheets and Lab Reports
Appendix B	Dust Sampling for Asbestos, Field Survey Data Sheets and Lab Reports
Appendix C	Lead Dust Field Survey Data Sheets and Lab Reports
Appendix D	Lead Analyzer Test Results
Appendix F	Fungal and Bacterial Field Data Sheets and Lab Reports
Appendix F	Drawings of Sample Locations

HAZARDOUS MATERIALS ASSESSMENT
BETTYE DAVIS EAST ANCHORAGE HIGH SCHOOL ACADEMIC AREA SAFETY IMPROVEMENTS
ANCHORAGE, ALASKA

OVERVIEW

Bettye Davis East Anchorage High School, located in Anchorage, Alaska, was partially surveyed for the presence of asbestos-containing materials (ACM), and other potentially hazardous materials as a part of the design services for the Bettye Davis East Anchorage High School Academic Area Safety Improvements Project at the school for the Anchorage School District. The survey also provided a “good faith” inspection for hazardous materials that may be disturbed during the construction. The proposed work includes the disturbance, demolition, removal and disposal of lead-containing paints and/or lead-containing materials that is incidental to the renovation and remodeling project. Mr. Brandon W. Hill and Mr. Robert A. French, P.E. of EHS-Alaska, Inc. (EHS-Alaska) conducted the inspections in October 2020, and Mr. Chris Ottosen of EHS-Alaska conducted additional inspections in December 2020, and April 2021. Mr. Robert A. French, conducted the inspections in August 2023. EHS-Alaska has conducted many previous surveys throughout the school. Refer to the sample tables in Part D.

A. GENERALIZED REQUIREMENTS FOR HAZARDOUS MATERIALS

Potentially hazardous materials have been identified in Bettye Davis East Anchorage High School that will be affected by the proposed renovations. Those materials include asbestos, lead, polychlorinated biphenyls (PCBs), and mercury. Not all materials were tested for potentially hazardous components, other potentially hazardous materials, including those exterior to the building, such as contamination from underground fuel tanks may be present, but are not part of this report.

Buildings or portions of buildings that were constructed prior to 1978 which are residences, or contain day care facilities, kindergarten classes or other activities frequently visited by children under 6 years of age are classified as *child occupied facilities*. All work classified as “renovations” or disturbing more than 6 square feet of lead-based painted surfaces per room for interior activities or more than 20 square feet for exterior activities in child occupied facilities must comply with the requirements of 40 CFR 745. Portions of this building are classified as a *child occupied facility* and it is the Contractor’s responsibility to ensure the requirements of 40 CFR 745 are met. See lead testing results for locations of lead-based paints present in the project areas.

Only the materials that will be directly affected by this project are required to be removed. The quantities and types of materials are incorporated into the design documents for this renovation. The removal and disposal of potentially hazardous materials are highly regulated, and it is anticipated that removal and disposal of asbestos, lead and chemical hazards will be conducted by a subcontractor to the general contractor who is qualified for such removal. It is anticipated that the general contractor and other trades will be able to conduct their work using engineering controls and work practices to control worker exposure and to keep airborne contaminants out of occupied areas of the building. Refer to Section 01 35 45, Airborne Contaminant Control.

Settled and concealed dusts in areas not subject to routine cleaning are present throughout the building, including the roof, and inside and on top of architectural, mechanical, electrical, and structural elements, and those dusts have been identified to contain regulated air contaminants. This should not be read to imply that there is an existing hazard to building occupants (normal occupants of the building as opposed to construction workers working in the affected areas). However, depending on the specific work items involved and on the means and methods employed when working in the affected areas, construction workers could be exposed to regulated air contaminants from those dusts in excess of the OSHA Permissible Exposure Limits (PELs).

The settled and concealed dusts were examined and previously sampled by an EPA Certified Building Inspector and this report identifies the locations, sampling data and test results. The inspector determined that the dusts are not "asbestos debris" from an asbestos-containing building material (ACBM). The inspector also determined that the dusts do not contain more than one percent (1%) asbestos by weight, and therefore are not an asbestos-containing material (ACM). Reference 40 CFR 763.83.

"Awareness training" (typically 2 hours) and possibly respiratory protection will be required for all Contractor Personnel who will be disturbing the dusts. The extent of the training and protective measures will depend upon the airborne concentrations measured during air monitoring of the contractors work force, which depends on the means and methods employed to control the dusts. The air monitoring may be discontinued following a "negative exposure assessment" showing that worker exposures are below the OSHA permissible exposure limits for the type of work and means and methods employed. Previous air monitoring from similar jobs with similar conditions may be used as historical data to establish a "negative exposure assessment".

B. BUILDING DESCRIPTION

Bettye Davis East Anchorage High School, originally completed in 1960, has had multiple additions and several renovations. The Pool and Gym Building (referred to as the 1972 era/Sports Complex); the former Cafeteria/Shop Building (referred to as the 1972 era); the Benson Building (referred to as the 1973 era); and the East Benson Walkway, Art/Rifle Range, and a General Storage area (referred to as the 1974 era) were added in a multi-phase project starting in 1972. Portions of the Music area, the former courtyard in Area 6 and the Home Economics area were also renovated during these renovations. Other minor renovations included: asbestos removal and boiler replacement, a two phase re-roofing project, room finish and HVAC upgrades in the administration area in 1997, several HVAC upgrades to various areas, including substantial changes to the entire ventilation system in the Benson Building, asbestos abatement and cleaning of the 1960 utilidors in 1998 and finish upgrades in the corridors of the original building in 1999. Additional extensive renovations to the school were completed during a multi-phased project in the early 2000's, and another Earthquake Repairs project is still ongoing. The original eastern portion of the 1960 construction known as the "Academia Wing" has had relatively few renovations and still contains most of the original building layout and materials.

Roofs were typically of steel beams and open web steel joists supporting a metal deck. The interior partitions were a mixture of framed construction and concrete masonry units. Many of the original 1960 framed walls were finished with wire mesh and plaster, which was found to contain asbestos in a 2001 project, but those walls have been removed, and not found elsewhere in the building. The 1972, 1973 and 1974 projects included many poured concrete walls, and the "sacking" on those walls contained asbestos. The gypsum wallboard was covered with "Marlite" in some wet areas.

Corridor and classroom ceilings in the original construction were typically of 12" x 12" concealed grid ceiling tiles, or 2' x 4' "T"-Bar" acoustic ceiling tiles. Both of those ceiling systems had asbestos-containing mastics attaching the "L" channels to the perimeter walls. Toilets, and storerooms, etc., had gypsum wall board or plaster ceilings. The interior plaster was found to contain asbestos in several samples from the original building, with less than one percent found in other samples. That plaster has been removed. The exterior plaster soffits were tested and did not contain asbestos.

Similarly, a smoothing compound sampled at the doorway of the Boys Bathroom in the former Music wing was found to contain asbestos in one sample. Twelve other samples of "sacking" compounds from the other concrete walls in the building that were installed at the same time did not contain asbestos in any of the samples. It is believed that the "positive" smoothing compound that was found to be asbestos was actually a joint compound material that was likely applied at a different time from the original "sacking" material on the concrete. Therefore, only a small section of concrete was considered to be asbestos-containing, and that has been removed. The "sacking" used in the 1972 Sports Complex and former Cafeteria/Shop Building and the 1973 Benson Building did contain asbestos, and is assumed to be present

at the concrete finished walls in the "infill" of the former courtyard in the Academic Area, now called out as the Academic Area 8 and Computer Lab area 8B, including smaller offices.

The exterior of the school was covered with an asbestos-containing "textured paint" finish at some time, probably at the end of the 1970's multi-phase project. This textured paint was sprayed on all surfaces, including brick, concrete masonry units, concrete and metal wall panels of the original school. That "textured paint" still exists underneath the newer EIFS exterior finish installed in the 2000's multi-phase projects.

Floor finishes were mainly of vinyl asbestos tile or carpet over vinyl asbestos tile, or asbestos-containing mastic. The vinyl asbestos tile flooring was typically exposed in the classrooms. Vinyl asbestos tile flooring and mastics in the Administration area and many other areas were covered with carpeting. The cove base mastic of the original construction was found to contain asbestos. The carpet mastics in the Benson Building were found to contain asbestos.

The school is heated by various heating and ventilating systems. The original portion of the school had several smaller fan rooms that used the underfloor utilidors as supply and return ducts. Those utilidors and the piping within them were abated in 1998, but have remnant pipe insulation where piping exit the utilidors and go underneath the floor slab, and assumed asbestos-containing mastics and dampproofing on what were original "exterior" walls of the utilidors. The Music area is served by a Fan Room to the north of the Auditorium. The Classrooms adjacent to the present Library are served by Fan Room 4. The Benson Building, Sports Complex and Cafeteria/Shop buildings each were served by independent fan systems.

C. SAMPLING AND ANALYSIS

1. Asbestos-Containing Materials

The survey included sampling of suspect ACM materials that had not been sampled in prior asbestos surveys, or samples of materials where previous sampling had been inconsistent. The design has relied heavily on previous sampling conducted in other areas of the school, but which were constructed at the same time as the renovation area. Refer to the AHERA asbestos management plan available for review in the Anchorage School District offices for information on previous sampling which is not included in this report. Additional testing of materials pertinent to the project, including asbestos and lead in dust samples was conducted and is included in this report.

The samples were analyzed for the presence of asbestos by polarized light microscopy (PLM), the method of analysis recommended by the U.S. Environmental Protection Agency (EPA) to determine the composition of suspected asbestos-containing materials (EPA method 600/M4-82-020). Only materials containing more than 1% total asbestos were classified as "asbestos-containing" based on EPA and the Occupational Safety and Health Administration (OSHA) criteria. Samples that were analyzed to have less than 10% asbestos were "point-counted" by the laboratory for more accuracy. Samples that are listed as having a "Trace by Point Count" had asbestos fibers found in the material, but the fibers were not present at the counting grids. Table 1 in Part D below contains a summary list of the asbestos bulk samples and the applicable results.

A 2002 survey included 5 "microvac" samples of dust in the building according to the American Society for Testing and Materials (ASTM) Standard D5755 protocol, which estimates the concentration of the asbestos in the sampled dusts as the number of asbestos structures per unit area of sampled surface. Limited additional dust samples were taken in 2003, 2004, 2005 and 2009 and analyzed for concentration per unit area. A different analysis was used to determine the percentage of asbestos by weight. The samples taken after 2002 were analyzed for weight percentage of asbestos using ASTM Standard D5756. The same "microvacuum" technique was used to collect both types of dust samples. The "microvacuum" technique collected the dust samples, by pulling air through a 2 mm "tygon" tube into a 25 mm, 0.8µm mixed cellulose ester filter cassette by means of a battery operated vacuum pump operating at 2 liters of air per minute. Dust was collected from a surface that measured 100 square centimeters (cm²). The dust

in the filter cassette was then analyzed at the laboratory. For the D5755 samples, the asbestos content was reported as a concentration of asbestos structures per square centimeter area of surface sampled (St./cm²). For the D5756 samples, the asbestos content was reported as both a weight percentage and as the number of asbestos structures per unit area of sampled surface (St./cm²). Table 2 in Part D below contains a summary of the mass concentration and area concentration dust samples for asbestos and the applicable results.

The Mass Concentration and Area Concentration dust samples were analyzed for asbestos content by International Asbestos Testing Laboratories (IATL), Mt. Laurel, New Jersey a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

The Bulk Asbestos samples were mostly analyzed for asbestos content by International Asbestos Testing Laboratories (IATL), and a variety of different labs, all of which were also NVLAP accredited laboratories.

EPA regulations under 40 CFR 763 requires the use of Polarized Light Microscopy (PLM) to determine whether or not a material contains asbestos. While PLM analysis does a good job for most materials, it does have some limitations, both in the size of the fibers that are visible under a standard optical microscope, and because the organic matrix that the fibers are bound within can obscure the fibers. At the discretion of the building inspector and the client, some types of samples may be analyzed or re-analyzed by what is called TEM NOB, or Transmission Electron Microscopy for Non-Friable Organically Bound materials. TEM NOB is the definitive method for determining if asbestos is present, but TEM NOB use is not required by the EPA. TEM NOB analysis was not done for this project.

Field survey data sheets and laboratory reports of the bulk samples are included in Appendix A. Field survey data sheets and laboratory reports of the dust sampling for asbestos are included in Appendix B. Drawings showing sample locations are included as Appendix F.

2. Lead-Containing Materials

Nearly all surfaces in the building were coated with paint and most surfaces had been repainted. EHS-Alaska tested representative paints throughout the affected areas of the building using an Heuresis Pb200i X-Ray Fluorescence (XRF) lead paint analyzer (Serial # 1770 with software version 4.0-21). EHS-Alaska had previously tested paint in the building using a Heuresis Pb200i X-Ray Fluorescence (XRF) lead paint analyzer (Serial # 1770 with software version 4.0-21), NITON XL309 X-Ray Fluorescence (XRF) lead paint analyzer (Serial # U862NR0666 with software version 5.3), and a NITON XLi303AW X-Ray Fluorescence (XRF) lead paint analyzer (Serial # 14311 with software version 5.2C). The lead testing conducted was not a Lead-Based Paint Inspection or Screening as defined by HUD or EPA regulations, but was done to test surfaces that may be representative of those likely to be affected by this project. If surfaces and materials other than those tested are identified, the Contractor shall test and treat appropriately. Refer to the Lead Analyzer Test Results Table in Appendix D that identifies the surfaces tested, and the results. All surfaces affected by this project may not have been tested and therefore additional sampling may be required to refute the presence of lead-containing materials regulated by 29 CFR 1926.62 or lead-based paints in child occupied facilities regulated by 40 CFR 745. The Lead Test Locations are shown in Appendix F.

Previous surveys conducted in 2002, 2003, and 2004 included wipe samples of dust in the building. The lead dust samples were typically taken adjacent to the dust samples for asbestos described above. Dust was collected using ASTM E1728-99 protocol from a surface that measured 100 square centimeters (cm²), using a towelette, manufactured especially for lead dust sampling. The dust on the wipe was then analyzed at the laboratory using Flame Atomic Absorption Spectrometry, (FAAS), according to the EPA SW 846:6010:7420 method. The lead content was reported as a concentration of micrograms of lead per square foot of surface sampled (µg/ft²). Table 3 in Part D below contains a summary list of the lead dust samples and the applicable results.

EPA and the Department of Housing and Urban Development (HUD) have defined lead-based paint as any paint or other surface coating that contains lead equal to or in excess of 1.0 milligram per square centimeter

(mg/cm²) or 0.5 percent by weight. XRF results are classified as positive (lead is present at 1.0 mg/cm² or greater), negative (less than 1.0 mg/cm² of lead was present) or inconclusive (the XRF could not make a conclusive positive or negative determination). Tests that were invalid due to operator error are shown as void tests.

A Performance Characteristic Sheet (PCS) for the Heuresis Pb200i, NITON XL309, and NITON Xli303AW is available upon request. This PCS data provides supplemental information to be used in conjunction with Chapter 7 of the “HUD Guidelines”. Performance parameters provided in the PCS are applicable when operating the instrument using the manufacturer’s instructions and the procedures described in Chapter 7 of the “HUD Guidelines”. The instrument was operated in accordance with manufacturer’s instructions and Chapter 7 of the HUD Guidelines. No substrate correction is required for this instrument. There is no inconclusive classification for this instrument when using the 1.0 mg/cm² threshold.

3. Suspect Fungal and Bacterial Growth

Due to water leakage through the “ceiling” of the Lower Level Fan room NWL106 beneath the Plaza, there was a concern that mold or bacterial was present at the water impacted ductwork. The standing water was noted to have a “biofilm” suggesting the presence of microorganisms on the surface of the standing water, with a concern that Legionella and other bacteria are likely to be present.

Sampling was also conducted within a small furred out wall area in the ROTC Storage Room NWL107. The added wall furring was likely installed because of the repeated moisture problems and suspect fungal growth due to water in the Utiliduct between the east and west portions of the school.

The sampling included six bulk samples and tape lift samples for suspect fungal growth, and two samples of the stagnant water: One on top of the ductwork, and another in a utiliduct with heating and sprinkler piping where it exited the ROTC Storage room adjacent to the Lower Level Fan Room. Collected samples were placed within a “zip-lock” bag to prevent contamination during shipping. The samples were air freighted to EMLab P&K for analysis. EMLab P&K is staffed by certified microbiologists, maintains a rigorous Quality Assurance Program, is accredited by the American Industrial Hygiene Association (AIHA) Environmental Microbiology Laboratory Accreditation Program (EMLAP) and participates in the AIHA Environmental Microbiology Proficiency Analytical Testing Program (EMPAT). Sample results are summarized in Tables 4A and 4B below. Lab results are included in Appendix E, Refer to Appendix F for sample locations.

D. SURVEY RESULTS

1. Asbestos-Containing Materials

The following Table 1A lists the samples taken in July 2023 in selected areas of the Academic Area and the results of the laboratory analysis. Asbestos field survey data sheets and laboratory reports are included as Appendix A. Refer to Appendix F for sample locations.

TABLE 1A

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH-823-A01	Gray, smooth duct sealant	Area B, Lower Fan Room, NWL106. At round supply air duct from AHU-2, East side. Photo 42	None Detected
EH-823-A02	Gypsum wall board and joint compound	Area B, Lower Fan Room, NWL106. Wall added in 2001 for Elevator Machinery, Photo 50	None Detected, Both Layers

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH-823-A03	Gypsum wall board and joint compound	Area B, Lower Fan Room, NWL106. Wall added in 2001 for wing-wall by Elevator Shaft, Photo 16	None Detected, Both Layers
EH-823-A04	Gypsum wall board and joint compound	Area B, Lower Fan Room, NWL106. East Wall middle, at base, water damaged. Photo 58 & 59	None Detected in GWB, 3.4% chrysotile in joint compound
EH-823-A05	Gypsum wall board and joint compound	Area B, Lower Fan Room, NWL106. East Wall north, at base, water damaged. Photos 60 - 62	None Detected in GWB, 3.2% chrysotile in joint compound
EH-823-A06	Gypsum wall board and joint compound	Area B, ROTC Storage Rm, Likely original wall at buried pipe location, behind false wall and hatch. Photo 81.	None Detected in GWB, 3.6% chrysotile in joint compound
EH-823-A07	Gray, smooth duct sealant	Area B, Lower Fan Room, NWL106. At clamped joint in return air to AHU-2, East side. Photo 92	None Detected
EH-823-A08	FT-1, 12" x 12" white floor tile with gray and light gray smears, no visible mastic	Area F, Pottery Room 51, Center of room at loose tile. Photo 136	None Detected
EH-823-A09	Black mastic to floor tile FT-1 (12" x 12" white floor tile with gray and light gray smears) No tile.	Area F, Pottery Room 51, By entrance at missing tile. Photo 137	None Detected
EH-823-A10	Black mastic to floor tile FT-1 (12" x 12" white floor tile with gray and light gray smears) No tile.	Area F, Pottery Room 51, By built in central cabinet at missing tile. Photo 133 & 138	None Detected
EH-823-A11	Gypsum wall board and joint compound (lab did not find GWB)	Area F, Classroom 57A, at added GWB wall. Photo 166	None Detected
EH-823-A12	Gypsum wall board and joint compound	Area E, Computer Storage 38B, above Fin Tube at added wall. Photo 204	None Detected, Both Layers
EH-823-A13	Dark brown and cream cove base mastic	Area E, Computer Lab 88, in Server Room. Photo 217	None Detected, Both Layers
EH-823-A14	Black 4" cove base and dark brown cove base mastic	Area E, Classroom 36, at CMU divider wall. Photo 227	None Detected
EH-823-A15	White plaster base with sandy scratch coat with black grains, brown ceramic tile mastic	Area E, Girls Restroom SER1, wing wall. Photo 364	None Detected, three layers
EH-823-A16	Gypsum wall board and joint compound	Area E, Girls Restroom SER1, ceiling at strobe conduit penetration. Photo 366	None Detected in GWB, 2.3% chrysotile in joint compound
EH-823-A17	White plaster base with sandy scratch coat with black grains, brown ceramic tile mastic	Area E, Boys Restroom SER2, wing wall. Photo 379	None Detected, three layers
EH-823-A18	Gypsum wall board and joint compound	Area E, Boys Restroom SER2, ceiling at strobe conduit penetration. Photo 380	None Detected in GWB, 2.1% chrysotile in joint compound

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH-823-A19	Exterior Texture Paint on corrugated metal siding	Area E, to the east of the exit door at the Storefront renovation area. Photo 381	None Detected
EH-823-A20	Gray pliable sealant with Exterior Textured Paint.	Area E, between Waffle Panel and window frame at the Storefront renovation area. Photo 382	None Detected, Both Layers
EH-823-A21	Gray rubbery window glazing sealant, between glass and aluminum frame	Area E, upper set of windows, at the Storefront renovation area. Photo 391	None Detected
EH-823-A22	Non-textured exterior paint on the wavy corrugated panels above windows	Area E, above upper set of windows, at the Storefront renovation area. Photo 388	None Detected
EH-823-A23	White plaster base, brown ceramic tile mastic	Area F, Boys Restroom NER3, at entrance corner. Photo 398	None Detected, Both Layers
EH-823-A24	Gypsum wall board with joint compound	Area F, Boys Restroom NER3, at cut hole in ceiling. Photo 399	None Detected in GWB, 2.3% chrysotile in joint compound
EH-823-A25	White plaster base with sandy scratch coat with black grains, brown ceramic tile mastic	Area F, Boys Restroom NER3, above main mirror. Photo 400	None Detected, three layers
EH-823-A26	Black mastic to floor tile FT-1 (12" x 12" white floor tile with gray and light gray smears) No tile.	Area F, at hallway under drinking fountain outside Girls NER2 at missing tile, Photo 431 & 432	None Detected
EH-823-A27	Black mastic to floor tile FT-1 (12" x 12" white floor tile with gray and light gray smears) No tile.	Area F, Corridor to the north of Girls NER2 at missing tile, Photo 437	None Detected
EH-823-A28	Cheese Cloth pipe joint wrap, on fiberglass and PVC fitting cover	Area F, Pipe Chase to Girls NER2. Does not appear to have hard fitting or remnants. Photo 446	None Detected
EH-823-A29	Hard fitting at pipe size transition	Area F, Pipe Chase to Girls NER2. Only place noted with hard fitting or remnants. Photo 447	None Detected
EH-823-A30	Tan marlite mastic and joint compound	Area F, Furred out wall behind Drinking fountain by Girls NER2. Photo 453	None Detected in mastic, 2.6% chrysotile in JC
EH-823-A31	Gray grout and gray "puck" mastic to Ceramic tile base	Area F, Boys restroom NER1, at broken tile base. Photo 467	White layer, None Detected. Gray Grout, 0.75% chrysotile
EH-823-A32	Gray grout and Ceramic tile base	Area F, Girls restroom NER2 at pipe chase wall. NER2, Photo 468	None Detected, Both Layers
EH-823-A33	Gray "puck" mastic to Ceramic tile base	Area F, Girls restroom NER2 at pipe chase wall. NER2, Photo 468	1.6% chrysotile
EH-823-A34	Black cove base, tan cove base mastic	Area F, Boys restroom NER1, at water damaged Marlite. Photo 469	None Detected, Both Layers
EH-823-A35	Tan mastic to Marlite, and paper of GWB (Lab said layers were not separable)	Area F, Boys restroom NER1, at water damaged Marlite. Photo 469	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH-823-A36	Hard fitting at pipe size transition	Area F, Pipe Chase to Boys NER1, where pipe came through wall. Only place noted with hard fitting or remnants. Photo 490	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1B includes samples taken at the Patio Walkway “roof” in December 2020 and the results of the laboratory analysis. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1B

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1220-A01	Black pliable membrane on walking surface	Northeast side of walkway in “field” – Photo 31	None Detected
EB1220-A02	Tan pliable membrane on walking surface; grey deteriorated concrete on expanded polystyrene insulation	Northeast side of walkway in “field” – Photo 32	None Detected
EB1220-A03	Tan pliable membrane on walking surface; with black mastic	Northwest side of walkway at edge near column – Photo 36	None Detected, three layers
EB1220-A04	Grey rubber sealant on control joint; with white/off-white wall texture	South wall of east-west walkway on north side – Photo 79	Sealant, None Detected Texture, 1.3% chrysotile
EB1220-A05	Grey rubber sealant on control joint; with white/off-white wall texture	West wall of north-south walkway – Photo 80	Sealant, None Detected Texture, 1.1% chrysotile
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

The following Table 1C lists the samples taken in April 2021 throughout the second floor of the Benson Building and the results of the laboratory analysis. Asbestos field survey data sheets and laboratory reports are included as Appendix A. Refer to Appendix F for sample locations.

TABLE 1C

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0421-A01	(LCT2) Lay-in ceiling tile, 2' x 4' white with 1/8" wide x 1/8" – 3/8" long random fissures and pinholes, replacement LCT scattered throughout the second floor of the Benson Building	West side of second floor of the Benson Building's northwest stairwell – Photo 372	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0421-A02	(LCT3) Lay-in ceiling tile, 2' x 4' white with 1/4" – 1/2" long oblong fissures and 1/8" holes, replacement LCT only noted on the second floor of the Benson Building's northwest stairwell	West side of second floor of the Benson Building's northwest stairwell – Photo 373	None Detected
EB0421-A03	(LCT6) Lay-in ceiling tile, 2' x 4' white with 1/4" wide x 1/2" – 2" long directional fissures and 1/16" holes, replacement LCT scatted throughout the second floor of the Benson Building	West side of second floor of the Benson Building's northwest stairwell – Photo 374	None Detected
EB0421-A04	(LCT1) Replacement lay-in ceiling tile, 2' x 4' white with 1/8" wide x 1/4" – 1 1/2" long directional fissures and 1/16" holes, replacement LCT scatted throughout the second floor of the Benson Building	East side of second floor of the Benson Building's northwest stairwell – Photo 375	None Detected
EB0421-A05	White gypsum wall board; with yellow "Marlite" mastic	East wall of second floor of the Benson Building's northwest stairwell – Photo 376	None Detected Two Layers
EB0421-A06	(CB2) Cove base, 4" grey; with tan mastic	West side of lockers in common area north of Classroom 218 – Photo 378	None Detected Two Layers
EB0421-A07	(FT1) Floor tile, 12" x 12" beige/peach-colored with brown and beige streaks	West side of lockers in common area north of Classroom 218 – Photo 379	None Detected
EB0421-A08	(FT3) Floor tile, 12" x 12" streaks in various shades of deep blue color	At doors on north side of common area north of Classroom 218 – Photo 380	None Detected
EB0421-A09	(FT2) Floor tile, 12" x 12" blue with various other shades of blue and white streaks	Under windows on north side of common area north of Classroom 218 – Photo 381	None Detected
EB0421-A10	(SV1) Sheet vinyl, light grey with sandy appearance (no apparent mastic); with grey leveling compound	North side of Benson Skylink – Photo 382	None Detected Two Layers
EB0421-A11	(CB3) Cove base, 4" blue; with tan mastic; with grey cementitious wall texture	North side of Benson Skylink – Photo 383	None Detected Three Layers
EB0421-A12	(SV1) Sheet vinyl, light grey with sandy appearance; with brown/yellow mastic	South side of Benson Skylink – Photo 384	None Detected Two Layers
EB0421-A13	(CB3) Cove base, 4" blue; with tan mastic; with grey cementitious wall texture	South side of Benson Skylink – Photo 384	None Detected Three Layers

HAZARDOUS MATERIALS ASSESSMENT
Division 2
Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0421-A14	Light grey cementitious "backer board" material	Around column on southeast side of Benson Skylink – Photo 393	None Detected
EB0421-A15	Grey cementitious wall texture	Around column on southeast side of Benson Skylink – Photo 393	None Detected
EB0421-A16	(FT4) Floor tile, 12" x 12" beige with various shades of grey and brown streaks	Southeast side of Benson Skylink – Photo 394	None Detected
EB0421-A17	White sealant between cementitious wall texture and metal seismic joint cover	Northeast side of Benson Skylink – Photo 398	None Detected
EB0421-A18	Black pre-formed rubber window glazing seal/gasket	West side of Benson Skylink – Photo 399	None Detected
EB0421-A19	Black rubbery sealant for gaps in pre-formed rubber window glazing seal/gasket	West side of Benson Skylink – Photo 399	None Detected
EB0421-A20	Grey concrete	Around stair tower on west side of common area north of Classroom 218 – Photo 412	None Detected
EB0421-A21	Light grey-brown "hard fitting" insulation on rain leader piping	North side of common area north of Classroom 218 – Photo 413	None Detected
EB0421-A22	Hard dark grey duct seam sealant	South side of Fan Room F15 on supply air duct – Photo 414	None Detected
EB0421-A23	Hard dark grey duct seam sealant	On seams of outside air intake plenum on east side of Fan Room F15 – Photo 417	None Detected
EB0421-A24	Light grey sealant for air handling unit seam	On AHU #4 near center of Fan Room F15 – Photo 415	None Detected
EB0421-A25	(CB1) Cove base, 4" black; with tan mastic; with dark brown mastic	Northeast corner of Fan Room F15 – Photo 416	None Detected Two Layers
EB0421-A26	(LCT5) Lay-in ceiling tile, 2' x 4' white with 1/8" – 1/4" wide x 1/4" – 1/2" long random fissures and 1/8" holes, appears to be the original LCT throughout the second floor of the Benson Building	In Corridor 222 outside of entrance to Classroom 217 – Photo 418	None Detected
EB0421-A27	Black rubbery sealant between metal window frame and exterior textured pre-cast concrete panel	East exterior of Classroom 217 – Photo 421	None Detected

HAZARDOUS MATERIALS ASSESSMENT
Division 2
Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0421-A28	Black rubbery sealant on seams of metal window frame	East exterior of Classroom 217 – Photo 422	None Detected
EB0421-A29	Black gummy sealant on seams of metal window casing	East exterior of Classroom 217 – Photo 423	None Detected
EB0421-A30	(FT1) Floor tile, 12" x 12" beige/peach-colored with brown and beige streaks; with tan-brown mastic; with grey concrete	In Corridor 222 at entrance to Classroom 214 – Photo 424	None Detected Three Layers
EB0421-A31	(FT2) Floor tile, 12" x 12" blue with various other shades of blue and white streaks; with tan-brown mastic; with grey concrete	In Corridor 222 at entrance to Classroom 214 – Photo 425	None Detected Three Layers
EB0421-A32	(CB1) Cove base, 4" black; with off-white mastic; with vinyl covering on gypsum wall board panel; with yellow adhesive	East wall of Classroom 214 – Photo 426	None Detected Four Layers
EB0421-A33	White vinyl-covered gypsum wall board panel	East wall of Classroom 214 – Photo 426	None Detected
EB0421-A34	(LCT4) Lay-in ceiling tile, 2' x 4' white with 1/8" oblong fissures and 1/32" holes, appears to be from the 2002 Phase 1 Deferred and Phase 2 project and used as a replacement LCT scattered throughout the second floor of the Benson Building	South side of "north" Corridor 222 – Photo 427	None Detected
EB0421-A35	(LCT6) Lay-in ceiling tile, 2' x 4' white with 1/4" wide x 1/2" – 2" long directional fissures and 1/16" holes, replacement LCT scattered throughout the second floor of the Benson Building	South side of "north" Corridor 222 – Photo 428	None Detected
EB0421-A36	(LCT5) Lay-in ceiling tile, 2' x 4' white with 1/8" – 1/4" wide x 1/4" – 1/2" long random fissures and 1/8" holes, appears to be the original LCT throughout the second floor of the Benson Building; with hard yellow patching material	South side of "north" Corridor 222 – Photo 429	None Detected Two Layers
EB0421-A37	White joint compound	Southeast corner of Classroom 213 – Photo 434	None Detected
EB0421-A38	Black gummy sealant on seams of metal window casing	East exterior of Classroom 217 – Photo 431	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0421-A39	White joint compound, possibly thick paint on seam of vinyl-covered gypsum wall board panel	West wall of Corridor 222 outside of Classroom 212 – Photo 435	None Detected
EB0421-A40	White joint compound	East wall of Office 211 – Photo 437	None Detected
EB0421-A41	White gypsum wall board; with white joint compound	North wall of Office 211A – Photo 436	None Detected Two Layers
EB0421-A42	(LCT2) Lay-in ceiling tile, 2' x 4' white with 1/8" wide x 1/8" – 3/8" long random fissures and pinholes, replacement LCT scatted throughout the second floor of the Benson Building	Northeast side of Office 211 – Photo 438	None Detected
EB0421-A43	(LCT1) Replacement lay-in ceiling tile, 2' x 4' white with 1/8" wide x 1/4" – 1 1/2" long directional fissures and 1/16" holes, replacement LCT scatted throughout the second floor of the Benson Building	Northwest side of Corridor 222 "lobby area" – Photo 439	None Detected
EB0421-A44	Light grey "hard fitting" insulation on cold water piping to drinking fountain; with off-white "cheesecloth" wrap	Northwest side of Corridor 222 "lobby area" – Photo 441	None Detected Two Layers
EB0421-A45	Tan-yellow mastic for ceramic wall tile	North wall of Boys SWR3 from inside of plumbing chase – Photo 458	None Detected
EB0421-A46	White grout for ceramic wall tile	North wall of Boys SWR3 from inside of plumbing chase – Photo 458	None Detected
EB0421-A47	Light grey "hard fitting" insulation on hot water supply piping to sinks, at pipe support	Inside of plumbing chase on north side of Boys SWR3 – Photo 460	None Detected
EB0421-A48	Light grey "hard fitting" insulation on cold water supply piping to sinks and toilets, at pipe support	Inside of plumbing chase on north side of Boys SWR3 – Photo 461	None Detected
EB0421-A49	Light grey "hard fitting" insulation on cold water supply piping to toilet, at elbow	Inside of plumbing chase on north side of Boys SWR3 – Photo 462	None Detected
EB0421-A50	Grey grout for ceramic mosaic floor tile; with dark brown "tab" mastic	West side of Boys SWR3 at damaged floor area – Photo 463	None Detected Two Layers

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0421-A51	(GCT1) Glued-on ceiling tile, 12" x 12" white with 1/8" wide x 1/8" – 3/8" long random fissures and pinholes, appears to be the original GCT on the second floor of the Benson Building; with dark brown "puck" mastic	West side of Boys SWR3 – Photo 464	None Detected Two Layers
EB0421-A52	Light grey "hard fitting" insulation on cold water supply branch piping to janitor sink, at tee	Inside of plumbing chase on north side of Janitor 200D – Photo 465	None Detected
EB0421-A53	(FT4) Floor tile, 12" x 12" beige with various shades of grey and brown streaks; with black flooring mastic	East side of Toilet 200B – Photo 466	FT4- 1.2% Chrysotile; Mastic- 1.3% Chrysotile
EB0421-A54	(FT4) Floor tile, 12" x 12" beige with various shades of grey and brown streaks; with black flooring mastic	East side of Toilet 200C – Photo 467	FT4- 1.2% Chrysotile; Mastic- 1.5% Chrysotile
EB0421-A55	Black rubber stair stringer; with tan mastic	South wall of central hallway on second floor of Benson Building – Photo 468	Rubber- 1.6% Chrysotile; Mastic- None Detected
EB0421-A56	(FT3) Floor tile, 12" x 12" streaks in various shades of deep blue color; with black mastic	Outside of entrance to Girls SWR4 – Photo 469	None Detected Two Layers
EB0421-A57	(FT1) Floor tile, 12" x 12" beige/peach-colored with brown and beige streaks; with black mastic	At entrance to Girls SWR4 – Photo 470	FT1- 0.25% Chrysotile; Mastic- None Detected
EB0421-A58	White floor leveling compound/filler; with grey concrete	At entrance to Girls SWR4 – Photo 470	None Detected Two Layers
EB0421-A59	Grey grout for ceramic mosaic floor tile	At entrance to Girls SWR4 – Photo 470	None Detected
EB0421-A60	White grout for ceramic wall tile	Southwest corner of Girls SWR4 – Photo 471	None Detected
EB0421-A61	(GCT1) Glued-on ceiling tile, 12" x 12" white with 1/8" wide x 1/8" – 3/8" long random fissures and pinholes, appears to be the original GCT on the second floor of the Benson Building; with dark brown "puck" mastic	South side of Girls SWR4 – Photo 472	None Detected Two Layers
EB0421-A62	(GCT2) Glued-on ceiling tile, 12" x 12" white with 1/4" wide x 1/2" – 2" long directional fissures and 1/16" holes, replacement tile only noted in Girls SWR4; with dark brown "puck" mastic	South side of Girls SWR4 – Photo 473	None Detected Two Layers

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0421-A63	(GCT3) Glued-on ceiling tile, 12" x 12" white with few 3/16" wide x 1/2" – 1 1/2" long directional fissures and pinholes, replacement tile only noted in Girls SWR4; with dark brown "puck" mastic	South side of Girls SWR4 – Photo 474	None Detected Two Layers
EB0421-A64	Brown gypsum wall board; with tan-yellow mastic for ceramic wall tile	Inside of plumbing chase on south side of Girls SWR4 – Photo 475	None Detected Two Layers
EB0421-A65	Light grey "hard fitting" insulation on cold water supply piping to sinks and toilets, at 45	Inside of plumbing chase on south side of Girls SWR4 – Photo 476	None Detected
EB0421-A66	Grey mortar for ceramic mosaic floor tile	At damaged floor area near center of Girls SWR4 – Photo 477	None Detected
EB0421-A67	(SV2) White with various shades of grey birch bark pattern; with yellow mastic; concealed floor tile of unknown size or pattern, white in color; with black flooring mastic	Northwest side of Room 209 – Photo 478	None Detected in SV2 or Yellow Mastic; FT- Trace Chrysotile; Black Mastic- 1.1% Chrysotile
EB0421-A68	Older light grey sealant for metal door frame to concrete block wall seam	Northwest side of Room 209 – Photo 479	None Detected
EB0421-A69	White joint compound	South wall of Room 209 – Photo 480	None Detected
EB0421-A70	White joint compound	South wall of Room 209C – Photo 481	None Detected
EB0421-A71	(SV2) White with various shades of grey birch bark pattern; with yellow mastic; with grey leveling compound	Southwest corner of Room 209C – Photo 482	None Detected Three Layers
EB0421-A72	(CB4) Cove base, 6" black; with light grey mastic; with white gypsum wall board	Southwest corner of Room 209C – Photo 482	None Detected Three Layers
EB0421-A73	Hard light grey patch material on vinyl-covered partition wall	South wall of Classroom 208 – Photo 483	None Detected
EB0421-A74	White concrete "sacking"	Loose on floor of south stairwell in the Benson Building – Photo 487	None Detected
EB0421-A75	(LCT5) Lay-in ceiling tile, 2' x 4' white with 1/8" – 1/4" wide x 1/4" – 1/2" long random fissures and 1/8" holes, appears to be the original LCT throughout the second floor of the Benson Building	South side of Classroom 204 – Photo 491	None Detected
EB0421-A76	Hard light grey patch material on vinyl-covered partition wall	North wall of Classroom 214 – Photo 492	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0421-A77	(FT5) Floor tile, 12" x 12" beige birch bark pattern; with black mastic	Under windows on the south side of common area south of Classroom 202 – Photo 500	FT5- Trace Chrysotile; Mastic- None Detected
EB0421-A78	(FT5) Floor tile, 12" x 12" beige birch bark pattern; with black mastic	East side of common area south of Classroom 202 – Photo 501	FT5- Trace Chrysotile; Mastic- None Detected
EB0421-A79	Grey-green sealant on duct flange	West side of Fan Room F14 on supply air duct – Photo 502	None Detected
EB0421-A80	Grey-green sealant on duct flange	West side of Fan Room F14 on supply air duct – Photo 504	None Detected
EB0421-A81	Grey-green sealant where supply air duct connects to air handling unit	Near center of Fan Room F14 at supply air duct to AHU #1 connection – Photo 504	None Detected
EB0421-A82	White sealant/gasket at heat piping connection to coils in AHU#1	East side of Fan Room F14 – Photo 507	None Detected
EB0421-A83	Light grey sealant on seams of air handling unit	On seams of AHU #1 near center of Fan Room F14 – Photo 508	None Detected
EB0421-A84	Grey rubbery sealant on seams of outside air intake plenum	East side of Fan Room F14 – Photo 509	None Detected
EB0421-A85	Grey-green sealant on seams of outside air intake plenum	East side of Fan Room F14 – Photo 510	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

The following Table 1D lists the samples taken in October 2020 and the results of the laboratory analysis. Asbestos field survey data sheets and laboratory reports are included as Appendix A. Refer to Appendix F for sample locations.

TABLE 1D

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH1020-A01	Yellow ceiling grid mastic	East side of Eastern Benson Walkway where ceiling grid attaches to CMU wall. Photo B22	3.6% Chrysotile
EH1020-A02	Black tarry dampproofing on concrete wall	East side of Eastern Benson Walkway above ceiling grid at CMU wall. Photo B26	1.1% Chrysotile

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH1020-A03	Black apparently roofing tar	East side of Eastern Benson Walkway at top of CMU wall where original roof was constructed. Photo B27	None Detected
EH1020-A04	LCT-1, 2'x4' galaxy, lay-in ceiling tile	East side of Eastern Benson Walkway in middle of room. Photo B28	None Detected
EH1020-A05	Cement fiber board	Southeast side of Eastern Benson Walkway from preexisting hole in column, at bottom of stairs. Photo R23	20% Chrysotile
EH1020-A06	Cement fiber board; with yellow mastic; with gypsum board	North side of Eastern Benson Walkway at base of column in middle of upper slope. Photo R24, R25	Cement- 20% Chrysotile; None Detected Two Other Layers
EH1020-A07	LCT-3, 2'x4' short, narrow directional fissures, 1/16" holes, lay-in ceiling tile	East side of Eastern Benson Walkway at south side of middle section of room. Photo B29	None Detected
EH1020-A08	LCT-2, 2'x4' short directional fissures, 1/16" holes, lay-in ceiling tile	East side of Eastern Benson Walkway at south side of room. Photo B30	None Detected
EH1020-A09	Yellow mastic to hold blue foamboard insulation	East side of Eastern Benson Walkway at top of south side concrete wall. Photo B35	None Detected
EH1020-A10	Black cove base; with dark brown mastic; with cream mastic	Southeast side of Eastern Benson Walkway at base of column at top of stairs. Photo R26, R27	None Detected Three Layers
EH1020-A11	Blue raised dot floor; with yellow contact cement; with grey concrete	Southeast side of Eastern Benson Walkway at base of column at top of stairs. Photo R26	None Detected Three Layers
EH1020-A12	Black stair stringer	Southeast side of Eastern Benson Walkway at top of stairs. Photo R28	None Detected
EH1020-A13	LCT-3, 2'x4' short, narrow directional fissures, 1/16" holes, lay-in ceiling tile	Northeast corner of Eastern Benson Walkway. Photo B36	None Detected
EH1020-A14	LCT-1, 2'x4' galaxy, lay-in ceiling tile	Northeast corner of Eastern Benson Walkway. Photo B37	None Detected
EH1020-A15	Yellow mastic to hold blue foamboard insulation	Northeast corner of Eastern Benson Walkway at top corner of north concrete wall. Photo B38	None Detected
EH1020-A16	Black stair stringer	South side of Eastern Benson Walkway at bottom of lower stairs. Photo R29	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH1020-A17	Black cove base; with dark brown mastic	South side of Eastern Benson Walkway below bottom of lower stairs. Photo R30, R31	None Detected Two Layers
EH1020-A18	Black tarry waterproofing on concrete wall	Northeast corner of Eastern Benson Walkway above north double doors. Photo B40	None Detected
EH1020-A19	Black apparently roofing tar; with grey concrete	Northeast corner of Eastern Benson Walkway above north double doors at top of CMU wall where original roof was constructed. Photo B41, B42	None Detected Two Layers
EH1020-A20	Blue raised dot floor; with tannish mastic	North side of Eastern Benson Walkway at back side of upper set of lockers. Photo R32	None Detected Two Layers
EH1020-A21	Blue raised dot floor; with tannish/white mastic	North side of Eastern Benson Walkway at back side of lower set of lockers. Photo R33	None Detected Two Layers
EH1020-A22	LCT-2, 2'x4' short directional fissures, 1/16" holes, lay-in ceiling tile	North side of Eastern Benson Walkway inside north exterior doors. Photo B44, B45	None Detected
EH1020-A23	Yellow/brown carpet mastic	Under west side of carpet at upper section of lockers in Eastern Benson Walkway. Photo B46, B47	Trace Chrysotile
EH1020-A24	Yellow/brown carpet mastic	Under southwest corner of carpet at lower section of lockers in Eastern Benson Walkway. Photo B48, B49	None Detected
EH1020-A25	Gypsum board; with joint compound	Southeast side of Eastern Benson Walkway behind heater, below upper stairs. Photo R36, R37	GWB- None Detected; JC- 0.75% Chrysotile
EH1020-A26	Blue cove base; with brown mastic; with cream mastic	North side of Eastern Benson Walkway, west of exterior doors, under heater. Photo B52, B53	None Detected Three Layers
EH1020-A27	Tan cement fiber board mastic	Southwest side of Eastern Benson Walkway, behind heater. Photo R38	None Detected
EH1020-A28	Blue cove base; with yellow mastic; with tan mastic	Northeast side of Eastern Benson Walkway, near top of slope, under heater. Photo B55, B56	None Detected Three Layers
EH1020-A29	Gypsum board; with joint compound	Northwest side of Eastern Benson Walkway at wall behind heater, near bottom of lower slope. Photo R41	GWB- None Detected; JC- 1.1% Chrysotile GWB/JC Composite: Trace Chrysotile

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH1020-A30	Black window sealant at glazing	North side of Eastern Benson Walkway at window behind column, near top of lower slope. Photo B58, B59	None Detected
EH1020-A31	White paint	Concrete wall located behind northeast side of lower level lockers, at floor level of ramp in the Eastern Benson Walkway. Photo R43	None Detected
EH1020-A32	White paint	Concrete wall located on the back side of the east section of lockers in the Eastern Benson Walkway. Photo R44	None Detected
EH1020-A33	Black rubber sealant	Exterior edge of door frame at the south exterior door of the Eastern Benson Walkway. Photo R45	None Detected
EH1020-A34	Dark brown sealant patch	Exterior bottom corner of window east of south exterior door of the Eastern Benson Walkway. Photo R46	3.6% Chrysotile
EH1020-A35	Black cove base; with cream mastic	At base of northeast section of upper level lockers where cove base seam joins, in the Eastern Benson Walkway. Photo B61	None Detected Two Layers
EH1020-A36	Black rubber window glazing seal	At window next to column between both sets of stairs on the south wall in the Eastern Benson Walkway. Photo R47	None Detected
EH1020-A37	Black cove base; with cream mastic; with dark brown mastic	At base of east section of lower level lockers where cove base seam joins, in the Eastern Benson Walkway. Photo B63	None Detected Three Layers
EH1020-A38	Dark brown concrete joint filler	At northern base of center west concrete wall in the Eastern Benson Walkway. R67	None Detected
EH1020-A39	Dark brown concrete joint filler	At southern base of center west concrete wall in the Eastern Benson Walkway. R67	None Detected
EH1020-A40	Concrete wall texture	At bottom of northern section of center west concrete wall in the Eastern Benson Walkway. B75, B76, B77	None Detected
EH1020-A41	Concrete wall texture	Bottom of center west concrete wall between the concrete benches in the Eastern Benson Walkway. Photo B78, B79, B80	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH1020-A42	Concrete sacking	Bottom of the concrete wall north of the southwest door in the Eastern Benson Walkway. Photo B81, B82, B83	None Detected
EH1020-A43	Concrete sacking	Bottom of the concrete wall south of the northwest door in the Eastern Benson Walkway. Photo B84, B85, B86	None Detected
EH1020-A44	Grey reglet seal	Where roof meets the southwest corner of center west wall, on roof above the Eastern Benson Walkway. Photo R108	None Detected
EH1020-A45	Grey stretchy putty	Expansion joint where roof meets the southwest corner of center west wall, on roof above the Eastern Benson Walkway. Photo R109	None Detected
EH1020-A46	White sealant	Expansion joint where roof meets the southwest corner of center west wall, on roof above the Eastern Benson Walkway. Photo R109	None Detected
EH1020-A47	Black patch tar	Southwest roof wall next to Benson building above the Eastern Benson Walkway. Photo R110	None Detected
EH1020-A48	Roof tar	In scupper at south roof wall on lower section of roof above Eastern Benson Walkway. Photo B96	None Detected
EH1020-A49	Black parapet cap sealant	Parapet at top of south roof wall, at high side of lower roof section, above Eastern Benson Walkway. Photo R111, R112	None Detected
EH1020-A50	Black parapet cap sealant	Parapet at top of north roof wall, at high side of lower roof section, above Eastern Benson Walkway. Photo B97, B98	None Detected
EH1020-A51	Black rubbery wall membrane	On roof wall under parapet cap in middle of lower roof section, above Eastern Benson Walkway. Photo R113	None Detected
EH1020-A52	White parapet cap sealant	On roof wall under parapet cap in middle of lower roof section, above Eastern Benson Walkway. Photo R113	None Detected
EH1020-A53	Grey roof patch sealant	Southeast corner of roof above Eastern Benson Walkway. Photo R114	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH1020-A54	Thick white sandy texture	On wall above roll up door on north side of wall on Gym Bridge. Photo R179, R180	None Detected
EH1020-A55	Gypsum board	On wall above roll up door on north side of wall on Gym Bridge. Photo R179, R180	None Detected
EH1020-A56	FT-1. Beige 12" x 12" with white and grey streaks	Next to the northeast corner of the east floor mat on the Gym Bridge. Photo B100	4.2% Chrysotile
EH1020-A57	FT-1. Beige 12" x 12" with white and grey streaks; with black mastic	At base of the north exterior door on the Gym Bridge. Photo B101	FT- 2.5% Chrysotile; Mastic- 1.7% Chrysotile
EH1020-A58	Green glob mastic for Styrofoam insulation	Southwest corner of Gym Bridge above drop ceiling. Photo R187	0.25% Chrysotile
EH1020-A59	FT-2. Same as FT-1 but located under carpet; with black mastic; with green carpet mastic	Under carpet in center of floor on North side of seismic joint, on southside of the Gym Bridge. Photo B113	None Detected Three Layers
EH1020-A60	Gypsum board; with joint compound	Above ceiling on west wall on the south side of the south seismic joint on the Gym Bridge. Photo R190	GWB- None Detected; JC- 1.2% Chrysotile
EH1020-A61	Black cove base; with yellow mastic; with white joint compound; with tan mastic	North side of the Gym Bridge at base of east side of door to Gym. Photo B116, B117	None Detected Four Layers
EH1020-A62	LCT-4, 2'x4' short, skinny directional fewer fissures, 1/16" holes, lay-in ceiling tile	Above south entrance to the Gym Bridge. Photo R132, R133	None Detected
EH1020-A63	Black cove base; with cream mastic; with off-white joint compound	South side of the Gym Bridge at base of east side of double door frame. Photo B120	None Detected Three Layers
EH1020-A64	Blue cove base; with cream mastic; with brown mastic; with light tan joint compound	At base of west wall, just south of seismic joint on south side the Gym bridge. Photo B123	JC- 1.1% Chrysotile; None Detected Three Other Layers
EH1020-A65	Black cove base; with cream mastic	At base of west wall below the window south of the south side double doors on the Gym Bridge. Photo B126	None Detected Two Layers
EH1020-A66	Dark brown window glazing sealant; with black sealant	Window directly south of the elevator at the East wall on the Gym Bridge. Photo B129	None Detected Two Layers
EH1020-A67	Black window frame sealant	Window directly north of the south double doors at the west wall on the Gym Bridge. Photo B133	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH1020-A68	Gypsum board; with joint compound	Top of the first column from the south double doors at the east wall on the Gym Bridge. Photo R191, R192	GWB- None Detected; JC- 2.5% Chrysotile
EH1020-A69	Grey ceiling grid mastic	Top of the first column from the south double doors at the east wall on the Gym Bridge. Photo R191, R192	1.4% Chrysotile
EH1020-A70	Cement fiber board of insulation panel	Top of the first column from the south double doors at the east wall on the Gym Bridge. Photo R191, R192	30% Chrysotile
EH1020-A71	Gypsum board; with joint compound; with black sealant	At wall above drop ceiling and elevator on the Gym Bridge. Photo B136	None Detected Three Layers
EH1020-A72	FT-2. Same as FT-1 but located under carpet; with black mastic; with clear mastic; with tan mastic	Under carpet near north wall in front of elevator on the Gym Bridge. Photo B139	None Detected Four Layers
EH1020-A73	Gypsum board; with joint compound	Above drop ceiling at north wall in front of elevator on the Gym Bridge. Photo B139	None Detected Two Layers
EH1020-A74	Blue exterior "Stucco" (Lab identified grey and off-white "Stucco" layers)	Northeast exterior corner of Gym Bridge elevator, at ground floor. Photo R262	None Detected Two Layers
EH1020-A75	Grey exterior "Stucco"	Southwest exterior corner of ground level entry way to Gym Bridge elevator. Photo R227	None Detected
EH1020-A76	Grey sidewalk sealant; with grey concrete	Concrete stairs west of south entrance to ground level Gym Bridge elevator. Photo R227	None Detected Two Layers
EH1020-A77	FT-3. 12x12 cream with white and brown smears; with tan mastic	At base of south wall in front of ground level Gym ridge elevator. Photo R275	None Detected Two Layers
EH1020-A78	Cement fiber board of insulation panel	Above window on west wall in ground floor Gym Bridge elevator room. Photo R268	20% Chrysotile
EH1020-A79	Exterior texture paint (Lab identified white and grey layers)	On original ceiling above drop ceiling at northwest section of ground level Gym Bridge elevator room. Photo B144	None Detected Two Layers
EH1020-A80	Joint compound	At original ceiling at northwest corner of ground level Gym Bridge elevator room. Photo B145	None Detected
EH1020-A81	Grey ceiling grid mastic	At top of column located in the center of the Gym Bridge west wall. Photo R279	0.75% Chrysotile

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH1020-A82	LCT-5, 2'x4' flat galaxy, smaller fewer holes, lay-in ceiling tile	North side of the Gym Bridge in front of the double doors. Photo B147	None Detected
EH1020-A83	Exterior texture	Northeast exterior column below the Northern Benson Bridge. Photo R325	1.1% Chrysotile
EH1020-A84	Exterior texture	Southeast exterior column below the Northern Benson Bridge. Photo R327	1.2% Chrysotile
EH1020-A85	Tan mastic for foam insulation	On wall above west side interior double doors on the south side of the Northern Benson Bridge. Photo B167	None Detected
EH1020-A86	Firm, chalky, grey "hard fitting"; with off-white pipe wrap	Above west side interior double doors on the south side of the Northern Benson Bridge. Photo R334	None Detected Two Layers
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

The following Table 1E lists the samples taken in the Gym/Pool area in September 2018, October 2018, June 2019, and June 2020, and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project, but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included as Appendix A. Refer to Appendix F for sample locations.

TABLE 1E

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
Samples Collected on September 09, 2018			
EB0918-A01	(CB1) Cove base, 4" black; with dark brown mastic	Inside of closet in South Boy's Locker Room – Photo 36	None Detected Both Layers
EB0918-A02	(CB2) Cove base, 6" black; with tan mastic; with white plaster	Southwest corner of South Boy's Locker Room – Photo 37	None Detected All Layers
EB0918-A03	(FT1) Floor tile, 12" x 12" grey with black, white, and blue "pebbles"; with tan mastic	South side of South Boy's Locker Room – Photo 38	None Detected Both Layers
EB0918-A04	White grout for ceramic wall tile	East side of South Boy's Locker Room in shower area – Photo 55	None Detected
EB0918-A05	Ceramic floor tile base; with grey grout; with tan mastic	East side of South Boy's Locker Room in shower area – Photo 55	None Detected All Layers

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0918-A06	Tan mastic for ceramic wall tile	East side of South Boy's Locker Room in shower area – Photo 57	None Detected
EB0918-A07	Grey mortar for ceramic wall tile; with white “thinset”	On CMU wall around shower area in South Boy's Locker Room – Photo 56	None Detected Both Layers
EB0918-A08	Grey mortar for ceramic floor tile	In shower area of South Boy's Locker Room – Photo N/A	None Detected
EB0918-A09	Tan carpet mastic	Under carpet in South Boy's Locker Room Office – Photo 68	None Detected
EB0918-A10	Grey cementitious, possibly “sacking”	On base of concrete column in South Boy's Locker Room – Photo 69	None Detected
EB0918-A11	(FT2) Floor tile, 12” x 12” solid red; with tan mastic	West side of South Boy's Locker Room – Photo 70	None Detected Both Layers
EB0918-A12	Black tarry lining for clock/speaker box housing	North side of South Boy's Locker Room Office – Photo 72	8.3% Chrysotile
EB0918-A13	(FT3) Floor tile, 12” x 12” beige with white and brown streaks; with black mastic	In vestibule for South Boy's Locker Room – Photo 73	FT: 0.5% Chrysotile; Mastic: 6.3% Chrysotile
EB0918-A14	(FT3) Floor tile, 12” x 12” beige with white and brown streaks; with black mastic	In vestibule for North Boy's Locker Room – Photo 110	FT: 0.75% Chrysotile; Mastic: 10% Chrysotile
EB0918-A15	(CB1) Cove base, 4” black; with dark brown mastic; with off-white mastic; with grey cementitious, possibly “sacking”	On base of concrete column in North Boy's Locker Room – Photo 111	None Detected All Layers
EB0918-A16	Tan mastic for ceramic wall tile; with white grout	East side of North Boy's Locker Room shower area – Photo 112	None Detected Both Layers
EB0918-A17	Ceramic floor tile; with grey grout	In shower area of North Boy's Locker Room – Photo 113	None Detected Both Layers
EB0918-A18	Tan mastic for fiber reinforced plastic wall panel	On west side of toilet area in North Boy's Locker Room – Photo 114	None Detected
EB0918-A19	Tan mastic for Styrofoam insulation	Above ceiling on east side of North Boy's Locker Room – Photo 129	None Detected
EB0918-A20	Solid tan 12” x 12” floor tile; with black mastic	In area of replacement floor tiles near center of Gym Lobby – Photo 159	FT: None Detected; Mastic: 5.8% Chrysotile
EB0918-A21	Solid dark pink 12” x 12” floor tile	In area of replacement floor tiles near center of Gym Lobby – Photo 159	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0918-A22	(FT5) Floor tile, 12" x 12" beige with brown and tan streaks; with tan mastic	Around floor grate in northeast Gym Vestibule – Photo 160	None Detected Both Layers
EB0918-A23	(FT4) Floor tile, 12" x 12" white with black streaks; with tan mastic	In northeast Gym Vestibule – Photo 161	None Detected Both Layers
EB0918-A24	(FT5) Floor tile, 12" x 12" beige with brown and tan streaks; with tan mastic	Around floor grate in southeast Gym "Vestibule" – Photo 162	None Detected Both Layers
EB0918-A25	White joint compound	Above ceiling on gypsum board wall around Room 119 – Photo 168	None Detected
EB0918-A26	White gypsum wall board	Above ceiling on gypsum board wall around Room 119 – Photo 170	None Detected
EB0918-A27	(LCT1) Lay-in ceiling tile, 2' x 4' white with 1/8"-1/4" W x 1/2"-1 1/2" LG fissures and ϕ 1/32"- ϕ 1/8" holes	In corridor area outside of Room 119 – Photo 171	None Detected
EB0918-A28	(LCT1) Lay-in ceiling tile, 2' x 4' white with 1/8"-1/4" W x 1/2"-1 1/2" LG fissures and ϕ 1/32"- ϕ 1/8" holes	In corridor area outside of Room 119 – Photo 172	None Detected
EB0918-A29	White joint compound	On wood wall covering on wall around doors to north stairwell – Photo 174	None Detected
EB0918-A30	Black and white stair tread; with dark brown mastic	On north stairwell – Photo 175	Tread: 2.2% Chrysotile; Mastic: None Detected
EB0918-A31	Black stair stringer; with dark brown mastic	At bottom of north stairwell – Photo 176	Stringer: 1.1% Chrysotile; Mastic: None Detected
EB0918-A32	Dark pink coating on drinking fountain	Inside of Lower Gym Storage Room – Photo 192	2.0% Chrysotile
EB0918-A33	White caulking on metal door frame	Inside of Lower Gym Storage Room – Photo 195	None Detected
EB0918-A34	(FT6) Floor tile, 12" x 12", beige with white and grey streaks; with black mastic	South side of corridor to the south of the Upper Gym – Photo 209	FT: 3.5% Chrysotile; Mastic: 1.8% Chrysotile
EB0918-A35	(FT6) Floor tile, 12" x 12", beige with white and grey streaks; with black mastic	Outside of Room 136A in corridor to the south of the Upper Gym – Photo 210	FT: 3.1% Chrysotile; Mastic: 1.7% Chrysotile

HAZARDOUS MATERIALS ASSESSMENT
Division 2
Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0918-A36	(LCT2) Lay-in ceiling tile, 2' x 4' white with small random fissures and pinholes	In corridor to the south of the Upper Gym – Photo 217	None Detected
EB0918-A37	(LCT3) Lay-in ceiling tile, 2' x 4' white with 1/4" W squiggly fissures and pinholes	In corridor to the south of the Upper Gym – Photo 219	None Detected
EB0918-A38	Tan mastic for Styrofoam insulation	Above ceiling on south side of corridor to the south of the Upper Gym – Photo 222	None Detected
EB0918-A39	White grout for ceramic wall tile	Inside of pipe chase for toilets in West Girl's Locker Room – Photo 234	None Detected
EB0918-A40	White grout for ceramic wall tile	Inside of pipe chase for toilets in East Girl's Locker Room – Photo 240	None Detected
EB0918-A41	Dark brown mastic for cove base	On north side of West Girl's Locker Room – Photo 260	None Detected
EB0918-A42	White gypsum wall board	On south side of shower area in West Girl's Locker Room – Photo 264	None Detected
EB0918-A43	White gypsum wall board	On north side of West Girl's Locker Room near shower area – Photo 266	None Detected
EB0918-A44	Light tan mastic for ceramic floor tile curb	On north side of West Girl's Locker Room near shower area – Photo 265	None Detected
EB0918-A45	Grey grout for ceramic floor tile curb	On north side of West Girl's Locker Room near shower area – Photo 265	None Detected
EB0918-A46	Black tarry lining for clock/speaker box housing	West side of East Girl's Locker Room Office – Photo 270	2.5% Chrysotile
EB0918-A47	Light tan mastic for ceramic floor tile curb; with white "thinset"; with black mastic	On north side of East Girl's Locker Room Office at shower area – Photo 295	None Detected All Layers
EB0918-A48	Grey duct seam sealant	On sheet metal ducting near center of North Fan Room – Photo 304	None Detected
EB0918-A49	Grey cementitious, possibly "sacking"; with dark grey cementitious material	On north side of Upper Gym – Photo 383	None Detected Both Layers
EB0918-A50	White skim coat	On wood wall on west side of Upper Gym – Photo 384	None Detected
EB0918-A51	White skim coat	On wood wall on west side of Upper Gym – Photo 385	None Detected
EB0918-A52	White skim coat	On wood wall on east side of Upper Gym – Photo 386	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0918-A53	White skim coat	On wood wall on east side of Upper Gym – Photo 388	None Detected
EB0918-A54	White skim coat	On wood wall on east side of Upper Gym – Photo 389	None Detected
EB0918-A55	Ceramic wall tile; with white grout; with tan mastic	Loose inside of pipe chase in storage room in corridor to the north of the Upper Gym – Photo 402	None Detected All Layers
EB0918-A56	White caulking	On wood chase on east side of Room 130 – Photo 426	None Detected
EB0918-A57	Off-white cementitious material	Above ceiling behind Styrofoam insulation on north side of corridor to the north of the Upper Gym – Photo 441	None Detected
EB0918-A58	Dark red duct seam sealant	On sheet metal ducting near return/relief air junction near center of south Fan Room – Photo 367	1.7% Chrysotile
EB0918-A59	(FT1) Floor tile, 12" x 12" grey with black, white, and blue "pebbles"; with tan mastic	South side of South Boy's Locker Room – Photo 443	None Detected Both Layers
EB0918-A60	(CB2) Cove base, 6" black; with off-white mastic	West wall of South Boy's Locker Room – Photo 444	None Detected Both Layers
EB0918-A61	(FT5) Floor tile, 12" x 12" beige with brown and tan streaks; with tan mastic	Around floor grate in northwest Gym Vestibule – Photo 445	None Detected Both Layers
EB0918-A62	(FT4) Floor tile, 12" x 12" white with black streaks; with black/tan mastic	In northwest Gym Vestibule – Photo 446	FT: None Detected; Mastic: 1.4% Chrysotile
EB0918-A63	(FT2) Floor tile, 12" x 12" solid red; with tan mastic	West side of South Boy's Locker Room – Photo 442	None Detected Both Layers
Samples Collected on October 14, 2018			
EB0918-A64	Off-white fluffy spray-on acoustical insulation	South side of Upper Gym above ceiling at "inside 90" of concrete "T" beam – Photo 06	None Detected
EB0918-A65	Grey cementitious, possibly sacking	On east wall of Upper Gym above plywood infill panels – Photo 14	15% Chrysotile
EB0918-A66	Off-white fluffy spray-on acoustical insulation	East side of Upper Gym above ceiling at horizontal "roof deck" portion of concrete "T" beam – Photo 15	None Detected
EB0918-A67	Grey-green duct seam sealant	At heating coil duct flange at northwest corner of PEL 106 Storage – Photo 32	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0918-A68	White joint compound	South wall of north concession stand behind light switch cover plate – Photo 46	None Detected
EB0918-A69	White gypsum wall board	South wall of north concession stand behind light switch cover plate – Photo 46	None Detected
EB0918-A70	Black sink undercoating	On bottom of stainless steel sink on west side of north concession stand – Photo 47	1.2% Chrysotile
EB0918-A71	Off-white fluffy spray-on acoustical insulation	West side of Lower Gym above ceiling on side of concrete “T” beam – Photo 57	None Detected
EB0918-A72	Off-white fluffy spray-on acoustical insulation	Near center of Lower Gym above ceiling on side and bottom of concrete “T” beam – Photo 64	None Detected
EB0918-A73	Off-white fluffy spray-on acoustical insulation	Southeast side of Lower Gym above ceiling on side and bottom of concrete “T” beam – Photo 72	None Detected
EB0918-A74	Off-white fluffy spray-on acoustical insulation	Southeast side of Lower Gym above ceiling on duct – Photo 74	None Detected
EB0918-A75	White joint compound	North wall of south concession stand behind light switch cover plate – Photo 75	None Detected
EB0918-A76	(CB1) Cove base, 4” black; with brown mastic	North wall of south concession stand – Photo 76	None Detected Both Layers
EB0918-A77	Tan mastic for ceramic wall tile	East side of “Public” Women’s Restroom – Photo 83	None Detected
EB0918-A78	Exterior textured paint: white cementitious layer; with beige cementitious layer	North exterior of Pool/Gym complex at damaged area – Photo 139	White: None Detected; Beige: 2.4% Chrysotile
Samples Collected on June 20, 2019			
EB0918-A79	Black felt paper	Inside of plumbing chase for Pool locker room toilets on south (Women’s) side – Photo 35	None Detected
EB0918-A80	Black felt paper	Inside of plumbing chase for Pool locker room toilets on north (Men’s) side – Photo 36	None Detected
EB0918-A81	Black cove base mastic remnants	On base of CMU wall on east side of Women’s Pool Locker Room – Photo 37	None Detected
EB0918-A82	(CB1) Cove base, 4” black; with tan mastic	On west side of entry room for Women’s Pool Locker Room – Photo 38	None Detected Both Layers

HAZARDOUS MATERIALS ASSESSMENT
Division 2
Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0918-A83	White door frame sealant	On west side of entry room for Women's Pool Locker Room – Photo 39	None Detected
EB0918-A84	Off-white fluffy spray-on acoustical insulation	Northeast side of Pool above ceiling on bottom of concrete "T" beam – Photo 61	None Detected
EB0918-A85	(LCT-4) Lay-in ceiling tile, 2' x 4' white with rounded directional fissures and $\varnothing 1/32"$ - $\varnothing 1/16"$ holes	Northeast side of Pool – Photo T11	None Detected
EB0918-A86	Built-up roof materials: black tar; with black felt	Northeast side of Pool loose on ceiling tiles – Photo T13	None Detected Both Layers
EB0918-A87	Off-white fluffy spray-on acoustical insulation	Southwest side of Pool above ceiling on bottom of concrete "T" beam – Photo T26	None Detected
EB0918-A88	(LCT-4) Lay-in ceiling tile, 2' x 4' white with rounded directional fissures and $\varnothing 1/32"$ - $\varnothing 1/16"$ holes	Southwest side of Pool – Photo T27	None Detected
EB0918-A89	Built-up roof materials: black tar; with black felt	Southwest side of Pool loose on ceiling tiles – Photo T28	None Detected Both Layers
EB0918-A90	Black cove base mastic remnants	On base of CMU wing wall near center of Pool Janitor's Room – Photo 88	None Detected
EB0918-A91	White door frame sealant	On north side of Pool Janitor's Room – Photo 89	None Detected
EB0918-A92	White joint compound; with white gypsum wall board	Ceiling at southwest side of Pool Viewing Corridor – Photo 97	None Detected Both Layers
EB0918-A93	White gypsum wall board	Ceiling at southwest side of Pool Viewing Corridor – Photo 97	None Detected
EB0918-A94	White joint compound	West wall of Pool – Photo T31	None Detected
EB0918-A95	White joint compound	North wall of Pool – Photo T33	None Detected
EB0918-A96	White joint compound	Southeast corner of Pool – Photo 98	None Detected
EB0918-A97	White joint compound	Under bleachers on south side of Pool – Photo 99	None Detected
EB0918-A98	White gypsum wall board; with white joint compound	Under bleachers on south side of Pool – Photo 99	None Detected Both Layers
EB0918-A99	Black granulated multi-ply mineral cap built up roof sheet	Roof Core 01: north side of roof above Wrestling Classroom PEL 201 in field – Photo 48	None Detected
EB0918-A100	Black hot mop tar	Roof Core 01: north side of roof above Wrestling Classroom PEL 201 in field – Photo 49	None Detected
EB0918-A101	Black multi-ply tarry felt paper vapor retarder	Roof Core 01: north side of roof above Wrestling Classroom PEL 201 in field – Photo 50	None Detected

HAZARDOUS MATERIALS ASSESSMENT
Division 2
Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0918-A102	Black tar on concrete roof deck	Roof Core 01: north side of roof above Wrestling Classroom PEL 201 in field – Photo 51	None Detected
EB0918-A103	Black roofing tar	On sidewall between flashing and roof membrane on west side of north fan room – Photo 53	None Detected
EB0918-A104	Black roofing tar	On seam of mineral cap built-up roof sheet on west side of roof above Wrestling Classroom PEL 201 – Photo 54	None Detected
EB0918-A105	Black roofing tar remnant	On sidewall below louver on east wall of north fan room – Photo 56	None Detected
EB0918-A106	Black roofing tar on parapet	Between parapet and concrete sidewall on east side of roof above Wrestling Classroom PEL 202 – Photo 54	None Detected
EB0918-A107	Black roofing tar	Inside of roof drain bowl near center of roof above Wrestling Classroom PEL 202 – Photo 59	None Detected
EB0918-A108	Black granulated multi-ply mineral cap built up roof sheet	Roof Core 02: south side of roof above Wrestling Classroom PEL 202 adjacent to sidewall – Photo 65	None Detected
EB0918-A109	Black hot mop tar	Roof Core 02: south side of roof above Wrestling Classroom PEL 202 adjacent to sidewall – Photo 66	None Detected
EB0918-A110	Black multi-ply tarry felt paper vapor retarder	Roof Core 02: south side of roof above Wrestling Classroom PEL 202 adjacent to sidewall – Photo 67	None Detected
EB0918-A111	Black tar on concrete roof deck	Roof Core 02: south side of roof above Wrestling Classroom PEL 202 adjacent to sidewall – Photo 68	None Detected
EB0918-A112	Black multi-ply tarry felt paper vapor retarder	Roof Core 02: south side of roof above Wrestling Classroom PEL 202 on sidewall – Photo 69	None Detected
EB0918-A113	Black tar on concrete sidewall	Roof Core 02: south side of roof above Wrestling Classroom PEL 202 on sidewall – Photo 69	1.2% Chrysotile
EB0918-A114	Black roofing tar	Inside of roof drain bowl at northwest corner of roof above Main Gymnasium PEL 129 – Photo 71	None Detected

HAZARDOUS MATERIALS ASSESSMENT
Division 2
Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0918-A115	Black granulated multi-ply mineral cap built up roof sheet	Roof Core 03: north side of roof above Main Gymnasium PEL 129 adjacent to parapet wall – Photo 73	None Detected
EB0918-A116	Black hot mop tar	Roof Core 03: north side of roof above Main Gymnasium PEL 129 adjacent to parapet wall – Photo 74	None Detected
EB0918-A117	Black multi-ply tarry felt paper vapor retarder	Roof Core 03: north side of roof above Main Gymnasium PEL 129 adjacent to parapet wall – Photo 75	None Detected
EB0918-A118	Black tar on concrete roof deck	Roof Core 03: north side of roof above Main Gymnasium PEL 129 adjacent to parapet wall – Photo 76	None Detected
EB0918-A119	Black multi-ply tarry felt paper vapor retarder	Roof Core 03: north side of roof above Main Gymnasium PEL 129 on parapet wall – Photo 77	None Detected
EB0918-A120	Black tar on concrete parapet wall	Roof Core 03: north side of roof above Main Gymnasium PEL 129 on parapet wall – Photo 77	None Detected
EB0918-A121	Black granulated multi-ply mineral cap built up roof sheet	Roof Core 04: northwest side of roof above Main Gymnasium PEL 129 in field – Photo 79	None Detected
EB0918-A122	Black hot mop tar; with brown “fesco” board	Roof Core 04: northwest side of roof above Main Gymnasium PEL 129 in field – Photo 80	None Detected Both Layers
EB0918-A123	Black multi-ply tarry felt paper vapor retarder	Roof Core 04: northwest side of roof above Main Gymnasium PEL 129 in field – Photo 81	None Detected
EB0918-A124	Black tar on concrete roof deck	Roof Core 04: northwest side of roof above Main Gymnasium PEL 129 in field – Photo 82	0.25% Chrysotile
EB0918-A125	Black roofing tar	On seam of mineral cap built-up roof sheet on south side of roof above Main Gymnasium PEL 129 – Photo 84	None Detected
EB0918-A126	Black granulated multi-ply mineral cap built up roof sheet	Roof Core 05: southeast side of roof above Main Gymnasium PEL 129 in field – Photo 86	None Detected
EB0918-A127	Black hot mop tar; with brown “fesco” board	Roof Core 05: southeast side of roof above Main Gymnasium PEL 129 in field – Photo 87	None Detected Both Layers
EB0918-A128	Black multi-ply tarry felt paper vapor retarder	Roof Core 05: southeast side of roof above Main Gymnasium PEL 129 in field – Photo 88	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0918-A129	Black tar on concrete roof deck	Roof Core 05: southeast side of roof above Main Gymnasium PEL 129 in field – Photo 89	None Detected
EB0918-A130	Black granulated multi-ply mineral cap built up roof sheet	Roof Core 06: west side of roof above Girls Locker Room PEL 208 adjacent to sidewall – Photo 91	None Detected
EB0918-A131	Black hot mop tar; with brown “fesco” board	Roof Core 06: west side of roof above Girls Locker Room PEL 208 adjacent to sidewall – Photo 92	None Detected Both Layers
EB0918-A132	Black multi-ply tarry felt paper vapor retarder	Roof Core 06: west side of roof above Girls Locker Room PEL 208 adjacent to sidewall – Photo 93	None Detected
EB0918-A133	Black tar on concrete roof deck; with grey concrete	Roof Core 06: west side of roof above Girls Locker Room PEL 208 adjacent to sidewall – Photo 94	None Detected Both Layers
EB0918-A134	Black multi-ply tarry felt paper vapor retarder	Roof Core 06: west side of roof above Girls Locker Room PEL 208 on sidewall – Photo 95	None Detected
EB0918-A135	Black tar on concrete sidewall	Roof Core 06: west side of roof above Girls Locker Room PEL 208 on sidewall – Photo 95	None Detected
EB0918-A136	Black granulated multi-ply mineral cap built up roof sheet	Roof Core 07: south side of roof above Fitness Room PEL 205 in field – Photo 97	None Detected
EB0918-A137	Black hot mop tar; with brown “fesco” board	Roof Core 07: south side of roof above Fitness Room PEL 205 in field – Photo 98	None Detected Both Layers
EB0918-A138	Black multi-ply tarry felt paper vapor retarder	Roof Core 07: south side of roof above Fitness Room PEL 205 in field – Photo 99	None Detected
EB0918-A139	Black tar on concrete roof deck	Roof Core 07: south side of roof above Fitness Room PEL 205 in field – Photo 100	None Detected
EB0918-A140	Black roof patch tar	On VTR on north side of roof above south fan room – Photo 102	None Detected
EB0918-A141	Grey roof patch tar	On VTR on north side of roof above south fan room – Photo 103	None Detected
EB0918-A142	Black roofing tar	On seam of mineral cap built-up roof sheet on west side of roof above south fan room – Photo 104	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0918-A143	Black roofing tar	Inside of roof drain bowl near center of roof above south fan room – Photo 106	None Detected
EB0918-A144	Black roofing tar remnant	On concrete sidewall on south side of roof above Fitness Room PEL 205 – Photo 107	None Detected
EB0918-A145	Black roofing tar	On seam of mineral cap built-up roof sheet on north side of roof above Fitness Room PEL 205 – Photo 108	None Detected
EB0918-A146	Black granulated multi-ply mineral cap built up roof sheet	Roof Core 08: west side of roof above Fitness Room PEL 205 adjacent to parapet wall – Photo 110	None Detected
EB0918-A147	Black hot mop tar; with brown “fesco” board	Roof Core 08: west side of roof above Fitness Room PEL 205 adjacent to parapet wall – Photo 111	None Detected Both Layers
EB0918-A148	Black multi-ply tarry felt paper vapor retarder	Roof Core 08: west side of roof above Fitness Room PEL 205 adjacent to parapet wall – Photo 112	None Detected
EB0918-A149	Black tar on concrete roof deck	Roof Core 08: west side of roof above Fitness Room PEL 205 adjacent to parapet wall – Photo 113	None Detected
EB0918-A150	Black multi-ply tarry felt paper vapor retarder	Roof Core 08: west side of roof above Fitness Room PEL 205 on parapet wall – Photo 114	None Detected
EB0918-A151	Black tar on concrete parapet wall	Roof Core 08: west side of roof above Fitness Room PEL 205 on parapet wall – Photo 114	None Detected
EB0918-A152	Black granulated multi-ply mineral cap built up roof sheet	Roof Core 09: west side of roof above south fan room in field – Photo 116	None Detected
EB0918-A153	Black hot mop tar; with brown “fesco” board	Roof Core 09: west side of roof above south fan room in field – Photo 117	None Detected Both Layers
EB0918-A154	Black multi-ply tarry felt paper vapor retarder	Roof Core 09: west side of roof above south fan room in field – Photo 118	None Detected
EB0918-A155	Black tar on concrete roof deck	Roof Core 09: west side of roof above south fan room in field – Photo 119	None Detected
EB0918-A156	Black granulated multi-ply mineral cap built up roof sheet	Roof Core 10: north side of roof above south fan room adjacent to parapet wall – Photo 121	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0918-A157	Black hot mop tar; with brown "fesco" board	Roof Core 10: north side of roof above south fan room adjacent to parapet wall – Photo 122	None Detected Both Layers
EB0918-A158	Black multi-ply tarry felt paper vapor retarder	Roof Core 10: north side of roof above south fan room adjacent to parapet wall – Photo 123	None Detected
EB0918-A159	Black tar on concrete roof deck	Roof Core 10: north side of roof above south fan room adjacent to parapet wall – Photo 124	None Detected
EB0918-A160	Black tar on concrete parapet wall	Roof Core 10: north side of roof above south fan room on parapet wall – Photo 125	None Detected
EB0918-A161	Black granulated multi-ply mineral cap built up roof sheet	Roof Core 11: south side of roof above north fan room in field – Photo 127	None Detected
EB0918-A162	Black hot mop tar; with brown "fesco" board	Roof Core 11: south side of roof above north fan room in field – Photo 128	None Detected Both Layers
EB0918-A163	Black multi-ply tarry felt paper vapor retarder	Roof Core 11: south side of roof above north fan room in field – Photo 129	None Detected
EB0918-A164	Black tar on concrete roof deck	Roof Core 11: south side of roof above north fan room in field – Photo 130	None Detected
EB0918-A165	Black granulated multi-ply mineral cap built up roof sheet	Roof Core 12: west side of roof above north fan room adjacent to parapet wall – Photo 132	None Detected
EB0918-A166	Black hot mop tar	Roof Core 12: west side of roof above north fan room adjacent to parapet wall – Photo 133	None Detected
EB0918-A167	Black multi-ply tarry felt paper vapor retarder	Roof Core 12: west side of roof above north fan room adjacent to parapet wall – Photo 134	None Detected
EB0918-A168	Black tar on concrete roof deck	Roof Core 12: west side of roof above north fan room adjacent to parapet wall – Photo 135	None Detected
EB0918-A169	Black tar on concrete parapet wall	Roof Core 12: west side of roof above north fan room on parapet wall – Photo 136	None Detected
EB0918-A170	Black mastic for "Marlite" wall panel; with brown "Marlite"	North wall of Staff Lockers PEL 140A adjacent to shower – Photo 163	None Detected Both Layers
EB0918-A171	Mauve ceramic floor tile; with white grout; with orange "tab" mastic; with grey mortar	Northeast corner of Mens Lockers PEL M1 – Photo 176	None Detected All Layers
EB0918-A172	Grey mortar for ceramic floor tile	Northeast corner of Mens Lockers PEL M1 – Photo 176	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0918-A173	Mauve ceramic floor tile; with white grout; with orange "tab" mastic; with grey mortar	Northwest corner of Men's Lockers PEL M1 – Photo 178	None Detected All Layers
EB0918-A174	Grey mortar for ceramic floor tile	Northwest corner of Men's Lockers PEL M1 – Photo 178	None Detected
EB0918-A175	Tan mastic for ceramic wall tile; with white grout	East side of shower area in Mens Lockers PEL M1 – Photo 179	None Detected (Analyzed as one layer)
EB0918-A176	Grey mortar for ceramic wall tile	East side of shower area in Men's Lockers PEL M1 – Photo 179	None Detected
EB0918-A177	Ceramic wall tile; with tan mastic for ceramic wall tile; with white grout	West side of shower area in Men's Lockers PEL M1 – Photo 180	None Detected All Layers
EB0918-A178	Grey mortar for ceramic wall tile	West side of shower area in Men's Lockers PEL M1 – Photo 180	None Detected
Samples Collected on June 04, 2020			
EB0918-A179	Spray-on "popcorn" ceiling material	At hallway to Gym from main corridor – Photo 01	None Detected
EB0918-A180	Sacking under spray-on "popcorn" ceiling material	At hallway to Gym from main corridor – Photo 01	5% Chrysotile
EB0918-A181	Surface spray-on "popcorn" ceiling material	North end of corridor on top of "waffle" between beams – Photo 02	None Detected
EB0918-A182	Surface spray-on "popcorn" ceiling material	Bottom of beam on Gym side near center of main corridor – Photo 03	None Detected
EB0918-A183	Surface spray-on "popcorn" ceiling material	Vertical surface of beam above entrance to Women's Locker Room – Photo 04	None Detected
EB0918-A184	Spray-on "popcorn" ceiling material	Vertical surface of beam above entrance to Women's Locker Room – Photo 05	None Detected
EB0918-A185	Overspray from spray-on "popcorn" ceiling material	South side of main corridor in junction box – Photo 06	None Detected
EB0918-A186	Debris from spray-on "popcorn" ceiling material	Loose on ceiling above PEL112 – Photo 07	None Detected
EB0918-A187	Tar of roof deck	Low roof above Gym near mechanical curb – Photo 26	2% Chrysotile
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1F includes samples taken in March 2014 and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar

materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1F

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB0314-A01	Black ventilation tar; with yellow insulation	Fan room on ventilation system-Photo 16	Black Tar-3.7% Chrysotile; Yellow Ins-ND
EB0314-A02	Black ventilation tar; with yellow insulation	Fan room above ventilation system-Photo 18	None Detected Both Layers
EB0314-A03	Black duct system vibration material	Fan room above vibration ISO-Photo 45	None Detected
EB0314-A04	Black foundation tar	Room 14 inside hatch on foundation-Photo 63	None Detected
EB0314-A05	Black foundation tar	Room 30 inside hatch on foundation wall-Photo 70	None Detected
EB0314-A06	Black foundation tar	Room 27 inside hatch on foundation wall-Photo 74	None Detected
EB0314-A07	Black foundation tar	Room 31 inside hatch on foundation wall-Photo 92	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1G includes samples taken in May and June 2012 and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1G

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
Samples Collected on May 20, 2012			
EB-0512-A01	Light grey sealant	On exterior between metal window frame and concrete wall near South Entry – Photo 81	None Detected
EB-0512-A02	Light grey sealant	On exterior between concrete wall and concrete foundation near South Entry – Photo 83	None Detected
EB-0512-A03	White sealant	On exterior at vertical concrete wall seam near South Entry – Photo 85	None Detected
EB-0512-A04	Brown sealant	On exterior between pipe and pipe support on west wall of Area 2 – Photo 91	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB-0512-A05	Light grey sealant	On exterior between metal window frame and concrete wall on south wall of Area 2 – Photo 105	None Detected
EB-0512-A06	Light grey sealant	On exterior between metal door frame and concrete wall on south wall of Area 2 – Photo 107	None Detected
EB-0512-A07	Light grey sealant	On exterior between vertical concrete wall and metal joint on east wall of Area 2 – Photo 85	None Detected
EB-0512-A08	Grey sealant	On exterior between “waffle board” wall panel and metal trim on south wall of Area 2 – Photo 111	None Detected
EB-0512-A09	White sealant	On exterior between metal trim for storefront windows and concrete foundation on south wall of Area 1 – Photo 119	1.1% Chrysotile
Samples Collected on June 06, 2012 (Hand Sketched Sample Locations)			
EB-0612-A01	Off-white exterior textured paint	On exterior corrugated metal siding on north wall of Commons Area – Photo 208	1.2% Chrysotile
EB-0612-A02	White gummy sealant	On exterior at metal wall panel to metal trim seam on north wall of Commons Area – Photo 210	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1H lists the samples taken in January 2012 in the area of the CTE Improvements in the former Cafeteria/Shop building between the Benson Building, and the Gym/Pool, and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1H

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS0112-A01	White joint compound	Behind light switch panel next to door on west wall in room C1– Photo 01	None detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS0112-A02	Lay-in ceiling tile-1 (2'x4', flush edges, painted white on one side only w/tan fibrous matrix w/shallow hi-density 1"x1/8" fissures parallel to width w/shallow hi-density ø1/16" holes)	Northwest quadrant of lay-in ceiling in room C1– Photo 03	None detected
EHS0112-A03	Lay-in ceiling tile-2 (2'x4', flush edges, painted white on one side only w/tan fibrous matrix w/o fissures w/deep hi-density ø1/16"-ø1/8" holes)	Northwest quadrant of lay-in ceiling in room C1– Photo 04	None detected
EHS0112-A04	Lay-in ceiling tile-3 (2'x4', flush edges, painted white on one side only w/tan fibrous matrix w/deep hi-density 1"-1.5"x1/8" fissures parallel to width w/deep hi-density ø1/16" holes)	Southwest quadrant of lay-in ceiling in room C1– Photo 06	None detected
EHS0112-A05	Gypsum wall board	Above lay-in ceiling on north wall of room C1– Photo 07	None detected
EHS0112-A06	White joint compound	Exterior northwest wall corner of room C1 in room 93– Photo 08	None detected
EHS0112-A07	Yellow mastic to black cove base	Exterior northwest wall corner of room C1 between black cove base and gypsum wall board in room 93– Photo 10	None detected
EHS0112-A08	Firebrick	On welding table next to east wall in room 93– Photo 11	None detected
EHS0112-A09	White joint compound	Southeast corner of room 92 where bathroom addition wall meets original concrete wall room 92– Photo 14	None detected
EHS0112-A10	Floor tile (12"x12", light brown, brown, tan, and quartz pebble pattern) with remnant yellow mastic to cove base on top and dirt on possible mastic to FT on bottom	Southwest corner of bathroom in room 92– Photo 15	None detected
EHS0112-A11	Yellow mastic to FRP	Exterior north wall of bathroom in room 92 between FRP and gypsum wall board in room 92– Photo 17	None detected
EHS0112-A12	White wall texture with paint	West wall of Office 'A' in room 92– Photo 15	None detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS0112-A13	White joint compound	Southwest corner of room 92 where Office 'A' addition wall meets original concrete wall in room 92– Photo 21	None detected
EHS0112-A14	Gray foam with light gray caulk to door frame	Entrance to Office 'B' between door frame and CMU in room 90– Photo 22	Foam-ND Caulk-ND
EHS0112-A15	Off-white sealant	North wall of Office 'B' between door frame and CMU in room 90– Photo 25	None detected
EHS0112-A16	Floor tile (12"x12", white and gray birch bark pattern) with mastic and/or leveling compound	Floor at north doorway in Office 'B' in room 90– Photo 28	Trace Chrysotile by point count
EHS0112-A17	Floor tile (12"x12", brown, tan, gray, and white w/blotches and streaks) with black mastic	Floor at north doorway in Office 'B' in room 90– Photo 28	Tile-2.7% Chrysotile/Blk Mastic-4.8% Chrysotile
EHS0112-A18	White joint compound	Southwest wall of break room in room 92– Photo 30	None detected
EHS0112-A19	White duct sealant	Fume hood exhaust manifold east CMU wall in room 93– Photo 32	None detected
EHS0112-A20	Gray concrete seam filler	West exterior stairs north of room 94– Photo MKS-92	None detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 11 includes samples taken in November 2009 in the Gym North Mechanical Room in the Pool/Gym Building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 11

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHG1109-A1	Joint Compound	Upper, North Mech Rm, 301, East wall, at bottom of furred, insulated wall, 4-12:22	2.3% Chrysotile
EHG1109-A2	Gray gasket on heat return, at check valve	Upper, North Mech Rm, 301, above main coil at supply fan	35% Chrysotile
EHG1109-A3	Vinyl duct jacket, with clear mastic	Upper, North Mech Rm, 301, above preheat coil at supply fan, 4-12:29	None Detected, both layers

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHG1109-A4	Sprayed-on Acoustic Material, fluffy dirty white with smaller, whiter chunks	Upper Gym, Rm 205, west of west backstop, on surface, not under-layer, of duct, 4-13:04	None Detected
EHG1109-A5	Sprayed-on Acoustic Material, fluffy dirty white with smaller, whiter chunks	Upper Gym, Rm 205, west of west backstop, closest to duct, at a knock-on joint 4-13:04	None Detected
EHG1109-A6	Sprayed-on Acoustic Material, fluffy dirty white with smaller, whiter chunks	Upper Gym, Rm 205, west of west backstop, at transition between SP and conc Tee 4-13:04	None Detected
EHG1109-A7	Sprayed-on Acoustic Material, fluffy dirty white with smaller, whiter chunks	Upper Gym, Rm 205, SW corner, adjacent to soffit, on conc deck at crack 4-13:17	None Detected
EHG1109-A8	Sprayed-on Acoustic Material, fluffy dirty white with smaller, whiter chunks	Upper Gym, Rm 205, SW corner, adjacent to soffit, on leg of Tee, 4-13:17	None Detected
EHG1109-A9	Rubber Gasket and clear mastic	Upper, North Mech Rm, 301, at door near preheat coil at supply fan, 4-14:05	None Detected
EHG1109-A10	Black coating inside Fan Box	Upper, North Mech Rm, 301, adjacent to abandoned Enthalpy Wheel at supply fan, 4-14:15	None Detected
EHG1109-A11	Joint compound, tape and Gypsum wall board	Upper, North Mech Rm, 301, West wall, at bottom of furred, insulated wall, 4-14:40	None Detected in GWB, 1.9% chrysotile in JC
EHG1109-A12	Gray-green sacking on concrete	2nd Level, Janitor Closet 229 at south wall, adjacent to stairs to Mech Rm, 4-14:31	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1J includes samples taken in April 2009 at the South Pool Fan Room in the Pool/Gym Building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1J

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
East42009-A01	White joint compound	1st level grids 21 and T at wall	3% Chrysotile
East42009- A02	AH-34 Insulation, dark fibrous cloth like	Penthouse grids 25.5 & O.5 underside of AH34 at seam	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
East42009- A03	Black vibration cloth	AH34 Grid 25 & P Penthouse @ Overhead duct	None Detected
East42009-A04	Grey fibrous Insulation at piping penetration	AH35 at piping penetration	None Detected
East42009-A05	AHU door sealant gasket	AH35 @ end vent door filter replacement access	None Detected
East42009-A06	Grey fibrous Insulation for AHU	AH35 at end of metal duct at vibration cloth and fiberglass duct union	None Detected
East42009-A07	Brown putty on side of fan unit	Fan 37 duct at grid S.5 and 24	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1K includes samples taken in July 2008 at doors throughout the school and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1K

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS0708-A01	Wood and white chalky door insulation	1960 Era, Wood door w/window to Classroom 21 along Southeast Street SES6 hallway.	1.4% Chrysotile 1.8% Amosite
EHS0708-A02	Grey cementitious material inside metal "mop" door frame	1960 Era, Inside original metal "mop" door frame to Classroom 21 along Southeast Street SES6 hallway.	None Detected
EHS0708-A03	Wood and white chalky door insulation	1960 Era, Wood door w/out window on original "mop" door frame to Storage Room of Classroom 21 along Southeast Street SES6 hallway.	1.1% Chrysotile 2.5% Amosite
EHS0708-A04	Wood and white chalky door insulation	1960 Era, Top panel of wood "Dutch" door to Storage Room inside Classroom 22 along Southeast Street SES6 hallway.	2.9% Chrysotile 2.1% Amosite
EHS0708-A05	Grey cementitious material inside metal "mop" door frame	1960 Era, inside the original metal "mop" door frame to Classroom 25 along Southeast Street SES6 hallway.	None Detected
EHS0708-A06	Brown paper honeycomb with red mastic door insulation	1960 Era, inside west metal door of storage room between Life Skills Classrooms 14 and 28.	None Detected Both Layers

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS0708-A07	Brown paper honeycomb with red mastic door insulation	1972 Era, inside metal door to General Storage 37 along Southeast Street SES2 hallway.	None Detected Both Layers
EHS0708-A08	Grey fibrous coating on the inside of the metal door frame	1972 Era, inside metal door frame (not "mop" door frame) of BPO office in General Storage 37 along Southeast Street SES2 hallway.	None Detected
EHS0708-A09	Yellow fibrous door insulation	1960 Era, inside metal door of Fan Room along South-East Street (SES2).	None Detected
EHS0708-A10	Grey cementitious material inside metal "mop" door frame	1960 Era, Inside original metal "mop" door frame of Classroom 33 along Southeast Street SES3 hallway.	None Detected
EHS0708-A11	Brown cementitious lining inside metal door frame	Pre-1972 Era, coating inside hollow metal door frame of NE12/14 Office on Northeast Street NES3 hallway.	None Detected
EHS0708-A12	Brown paper honeycomb with red mastic door insulation	Pre-1972 Era, Inside metal door to Rifle Range.	None Detected Both Layers
EHS0708-A13	Brown paper honeycomb with red mastic door insulation	1973 Era, Inside metal door to Storage Room, south of Science Classroom 101 on Southwest Street SWS1 hall.	None Detected Both Layers
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1L includes samples taken in July 2007 in the 1960 era of the building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1L

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
SPED-0707-A01	Black wall mastic (assumed to be a bulletin board mastic)	RM 28 NW corner.	1.2% Chrysotile
SPED-0707-A02	Grey grid mastic	RM 28 NW corner.	3.5% Chrysotile
SPED-0707-A03	9" tan/red floor tile	RM 49c	Tile – 5.5% Chrys. Mastic – 5.1% Chrys.
SPED-0707-A04	Black tile mastic	RM 49c	3.1% Chrysotile
SPED-0707-A05	White ceiling tile	RM 14 Center of ceiling	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
SPED-0707-A06	Black tile mastic	RM 14 NW corner	2.5% Chrysotile
SPED-0707-A07	Carpet mastic on tan tile	RM 14 NW corner	None Detected
SPED-0707-A08	Dark brown cove base mastic	RM 14 NW corner	None Detected
SPED-0707-A09	Black wall sealant	Utilidor accesses from RM 14 NE corner	None Detected
SPED-0707-A10	Black wall sealant	Utilidor accesses from RM 14 NE corner	None Detected
SPED-0707-A11	Black and grey floor tile mastic	Room 37c West wall along floor	2.2% Chrysotile
SPED-0707-A12	Tan tile with black mastic and tan carpet mastic	Room 37c West wall along floor	Tile – 1.2% Chrys. Blk. Mas.- 3.5% Chrys. Tan Mastic - ND
SPED-0707-A13	Tan cove base mastic	Room 37c West wall along floor	None Detected
SPED-0707-A14	Black wall sealant	Room 37c above suspended ceiling SE corner of room	None Detected
SPED-0707-A15	Black roofing tar	Room 37c above suspended ceiling SE corner of room	None Detected
SPED-0707-A16	White joint compound	RM 37c, W wall on corner of column	3.1% Chrysotile
SPED-0707-A17	White and tan joint compound	SE corner of Old Temporary Library	3.5% Chrysotile
SPED-0707-A18	Grey panel sealant	SE corner of Old Temporary Library room along bottom edge of metal panel	None Detected
SPED-0707-A19	White and grey ceiling tile	West wall of RM 37c on column	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1M includes samples taken in November 2005 in the Benson Building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1M

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1105-A1	Black patch tar on air hood	NE corner of roof, on Exhaust hood, 19-12:57	None Detected
EB1105-A2	Black patch tar on parapet sidewall	NE corner of roof, near scupper 19-12:57	None Detected
EB1105-A3	Black patch tar on air hood	SE corner of roof, on Exhaust hood, 19-13:04	None Detected

HAZARDOUS MATERIALS ASSESSMENT
Division 2
Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1105-A4	Black patch tar on base	SE corner of roof, on Exhaust fan Base, 19-13:04	None Detected
EB1105-A5	Black patch tar on parapet sidewall	SE corner of roof partially under exhaust hood,	None Detected
EB1105-A6	Black patch tar on parapet sidewall	West side of roof, near drains	None Detected
EB1105-A7	Black patch tar on electrical penetration	Center of roof, 2 sensors on conduit, 19-13:17	None Detected
EB1105-A8	Black patch tar	West center of roof, by hatch on exhaust fan base	None Detected
EB1105-A9	Black & gray patch tar	West center of roof, on roof hatch base	0.3% Chrysotile
EB1105-A10	Gray sealant, loose	Not sealing anything, on top of parapet at N jut-out, W side. 19-13:49	None Detected
EB1105-A11	Clear and black sealant	Parapet wall cap. Black may just be dirt. 19-13:49	None Detected
EB1105-A12	Dark black sealant?	Parapet wall cap, W side. Black may just be dirt. 19-13:53	None Detected
EB1105-A13	Clear and black sealant	Parapet wall cap. E side Black may just be dirt.	None Detected
EB1105-A14	2x4 susp. Clg tile, 3/8" & smaller random fissures, 1/16" holes	Rm 105, west side by teacher desk, 19-15:27	None Detected
EB1105-A15	CMU wall with ?? and yellow paint	Rm 105, west side by teacher desk	None Detected
EB1105-A16	Gray-green sealant on ductwork	Fan Rm F14, on main SW duct, 19-16:06, 16:42	None Detected
EB1105-A17	2x4 susp. Clg tile, 3/8" & smaller random fissures, 1/16" holes	Rm 202, west side by teacher desk	None Detected
EB1105-A18	White Duct Tape	SWS3, upper Southwest Street, at north end, 19-17:45	None Detected
EB1105-A19	2x4 susp. Clg tile, 3/4" & smaller directional fissure, 1/8" & 1/16" holes	SWS3, upper Southwest Street, at north end, 19-17:50	None Detected
EB1105-A20	Thin gray duct sealant	Fan Rm F15, by RF 2, upper duct, from plenum, 19-17:59	None Detected
EB1105-A21	Thin white remnant, on flange, possibly older fireproofing	Fan Rm F15, above RF 2, 19-18:00	1.5% Chrysotile
EB1105-A22	Fluffy gray fireproofing	Fan Rm F15, above RF 2, 19-18:00	None Detected
EB1105-A23	White Duct Tape	Fan Rm F15, above AHU-2, 19-17:52	None Detected
EB1105-A24	Coating on lower portion of concrete wall, w/blue paint	Fan Rm F15, center of S wall	None Detected
EB1105-A25	Brown duct pin mastic	Fan Rm F15, Plenum NE corner at loose fiberglass insul, 19-18:13	5.2% Chrysotile
EB1105-A26	Thin gray duct sealant	Fan Rm F15, Plenum NE corner at loose fiberglass insul, 19-18:13	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1105-A27	Hard brown end cap on big valve	Fan Rm F15, on fiberglass insul, under platform, 19-18:20	None Detected
EB1105-A28	Dark brown cove base mastic	On black cove, top of SW stairs, W wall at landing,	None Detected
EB1105-A29	Black mastic to Marlite, Marlite & gyp	At top of SW stairs, W wall at landing,	None Detected, Three layers
EB1105-A30	Brown mastic to black rubber tactile mat	At top of SW stairs	None Detected
EB1105-A31	Black lab sink material	Rm 105, NW Student lab table, 19-22:25	None Detected
EB1105-A32	Black plastic on wood lab counter-top	Rm 105, N side, 16" wide ledge, 19-22:25	None Detected
EB1105-A33	Black lab sink material	Rm 105, Teacher Demo table	None Detected
EB1105-A34	Black lab counter-top	Rm 105, Teacher Demo table, with drain grooves	None Detected
EB1105-A35	Paper honeycomb door filler	Door to Rm 105	None Detected
EB1105-A36	Lab hood base (Labconcor)	Rm 103, E side 24x48 base, otherwise sht mtl. 19-23:19, note ACM Bunsen burner pad in pic	None Detected
EB1105-A37	Black lab sink material	Rm 103, NE Center Student lab table	None Detected
EB1105-A38	Black plastic on wood lab counter-top	Rm 103, E side, 16" wide ledge	None Detected
EB1105-A39	Black lab counter-top	Rm 103, Teacher Demo table, with drain grooves, 19-23:36	None Detected
EB1105-A40	Black lab sink material	Rm 103, Teacher Demo table, 19-23:36	None Detected
EB1105-A41	Black lab sink material	Rm 101, Teacher Demo table	None Detected
EB1105-A42	Black lab counter-top	Rm 101, Teacher Demo table, with drain grooves	None Detected
EB1105-A43	Black plastic on wood lab counter-top	Rm 101, E side, 16" wide ledge	None Detected
EB1105-A44	Black lab sink material	Rm 101, NE central Student lab table, 19-23:56	None Detected
EB1105-A45	Sealant putty	Rm 101, NE central Student lab table, between lab top, and sink basin, 19-23:56	None Detected
EB1105-A46	Pinkish undercoating on drinking fountain	Janitor 191, back side of drinking fountain, 19-16:46	10% Chrysotile
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1N includes samples taken in March 2006 in the Benson Building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1N

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB306-A1	Gray exterior joint sealant	NE side Benson Bldg, at pre-cast panels below window, grid 7-D	None Detected
EB306-A2	Gray exterior joint sealant	SE side Benson Bldg, at pre-cast panels below window, grid 7-I	None Detected
EB306-A3	Gray exterior joint sealant	NW side Benson Bldg, at pre-cast panels below window, grid 4-E	None Detected
EB306-A4	Gray exterior joint sealant	SW side Benson Bldg, at pre-cast panels below window, grid 4-J	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1O includes samples taken in April 2006 in the Benson Building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1O

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB406-A1	2x4 LCT, Galaxy pattern, 3/8" & smaller fissures, 1/16" holes	SWR2 Girls restroom, near door, dominant tile in restroom	None Detected
EB406-A2	12x12 GCT, shallow 3/8" & smaller fissures, 1/16" holes, dark brown mastic	SWR2 Girls restroom at entrance vestibule	None Detected both layers
EB406-A3	12x12 GCT, shallow 3/8" & smaller fissures, 1/16" holes, dark brown mastic	191a Janitor, near conduit holes	None Detected both layers
EB406-A4	Cementitious Laboratory Table top	187 Electrical, old science table	None Detected
EB406-A5	Cementitious Laboratory Sink	187 Electrical, old science table	None Detected
EB406-A6	Gray-Green sealant	F14 Fan room, 2nd floor south, inside Mixing plenum	None Detected
EB406-A7	12x12 GCT, shallow 3/8" & smaller fissures, 1/16" holes, dark brown mastic	SWR4 Girls restroom in main room	None Detected both layers
EB406-A8	12x12 GCT, shallow 3/8" & smaller fissures, 1/16" holes, dark brown mastic	SWR3 Boys restroom in main room, at missing tile	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1P includes samples taken in November 2003 in the former Music Area and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1P

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1103-A1	White 12"x12" floor tile with brown mastic & green sticky carpet mastic	Vestibule 85a, NW corner	None Detected both layers
EB1103-A2	Gray 9"x9" floor tile with black mastic & brown carpet mastic	Room 83, NE corner	3.7% Chrysotile in tile, 2.1% Chrysotile in black mastic, none detected in brown mastic
EB11032-A3	Multiple colors of brown carpet mastic	Room 83, NE corner on top of 9x9 tile	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1Q includes samples taken in February 2004 in the former Music Area and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1Q

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB204-A1	Concrete sacking and paint	Corridor 101, N side opposite door to Rm 84c 16-1619	None Detected
EB204-A2	Orange Marlite, w/yellow mastic	Band director office, Rm 84b, east wall, 16-1625	None Detected, both layers
EB204-A3	2'x4' lay-in ceiling tile, "Galaxy" pattern, 3/8" random fissures	Band Rm 84, east side, 16-1629	None Detected
EB204-A4	Gypsum wall board, no tape or joint compound	Percussion storage, Rm 84a, above ceiling, west wall	None Detected
EB204-A5	Gypsum wall board, with tape and joint compound, no paint	Percussion storage, Rm 84a, above ceiling, east wall	0.75% Chrysotile
EB204-A6	Black foam carpet backing, mastic, joint compound and paper	Band Rm 84, south side, below fabric wall baffles	None Detected, both layers
EB204-A7	Cement board	Band Rm 84, south side, under raised floor, loose piece 16-1643	30% Chrysotile
EB204-A8	Light brown carpet mastic	Band Rm 84, south side, at floor heating grille, 16-1646	None Detected
EB204-A9	Dark brown carpet mastic, & yellow mastic	Band Rm 84, NE corner, on top of floor tile, 16-1652	None Detected
EB204-A10	Dark brown cove base mastic	Band Rm 84, NE corner, on vinyl wall board, 16-1652	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB204-A11	Plaster Scratch (gray w/black), and finish coats (white) and paint	Ceiling of Fan Rm 91c	None Detected
EB204-A12	Plaster Scratch (gray w/black) poking through wire mesh	Inner cavity of exterior wall void, reached through former windows, above clg, Rm 83, 17-1417	None Detected
EB204-A13	Dark brown cove base mastic	Rm 83, NW side, by fin-tube, on vinyl gyp board, 17-1448	None Detected
EB204-A14	Vinyl gyp board, remnants of cove base mastic, no joint compound	Rm 83, NW side, by fin-tube, no mastic visible to gwb, 17-1448	None Detected
EB204-A15	Plaster scratch coat (gray w/black), and finish coats (white) and paint	Rm 83, N side, above ceiling, 17-1455	None Detected
EB204-QC1	Plaster Scratch (gray w/black), and finish coats (white) and paint	Rm 83, N side, above ceiling, 17-1455, taken from EB204-A15	None Detected, both layers
EB204-A16	2'x4' lay-in ceiling tile, "Galaxy" pattern, 3/8" random fissures	Rm 83, North part, 17-1536	None Detected
EB204-A17	2'x4' lay-in ceiling tile, "Galaxy" pattern, 3/8" random fissures	Rm SE-V1, vestibule, South side	None Detected
EB204-A18	Green mastic (or grout?) to blue foam	Rm SE-V1, vestibule, N wall	None Detected
EB204-A19	Black tar on inside face of exterior concrete wall	Corridor SE-S1, at corner by vestibule SE-V1, N wall	None Detected
EB204-A20	Grout, scratch coat of plaster, ceramic tile & light brown mastic	Boys bathroom 87, W wall, at top of wainscot, 17-1653	None Detected, 3 layers
EB204-A21	Plaster Scratch (gray w/black), and finish coats (white) and paint	Ceiling of Boys bathroom 87	None Detected
EB204-A22	Plaster skim coat on CMU, 1/4" thick	Boys bathroom 87, N urinal wall, upper section	None Detected
EB204-A23	Concrete sacking and paint (probably a joint compound)	Boys bathroom 87, by Corridor SE-S1, N side by door	2.0% Chrysotile
EB204-A24	Yellow mastic, plaster finish coat (white), plaster scratch coat (gray w/Black) on CMU, 17-1714	Girls bathroom 90, S wall, under mirror	None Detected, both layers
EB204-QC2	Yellow mastic, plaster finish coat (white), plaster scratch coat (gray w/Black) on CMU, 17-1714	Girls bathroom 90, S wall, under mirror, taken from EB204-A24	None Detected, three layers
EB204-A25	Plaster Scratch (gray w/black), and finish coats (white) and paint	Ceiling of Girls bathroom 90	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB204-A26	Fiberglass sound board, with hardened edge, and perforated vinyl fabric	Practice room 83d, West wall above ceiling, 17-1735	None Detected, both layers
EB204-A27	Greenish sacking on concrete, no paint	Fan Room 91f, south wall, 17-1758	None Detected
EB204-A28	White door filler	Door to janitor, Rm 88	15% Chrysotile, 5% Amosite
EB204-A29	Plaster scratch coat(gray w/black) poking through wire mesh	Inner cavity of exterior wall void, reached through former windows, above clg, Rm 83a	None Detected
EB204-A30	"Old" Tan ceiling grid mastic	Above "new" ceiling on concrete, Rm 83a, 17-1833	1.2% Chrysotile
EB204-A31	Plaster Scratch (gray w/black), and finish coats (white) and paint	Above "new" ceiling W wall, Rm 83a, 17-1833	None Detected
EB204-A32	Plaster scratch coat(gray w/black) poking through wire mesh	Inner cavity of exterior wall void, reached through former windows, above clg, Rm 84d	None Detected
EB204-A33	Plaster Scratch (gray w/black), and finish coats (white) and paint	Above "new" ceiling S wall, Rm 84d 17-	None Detected
EB204-QC3	Plaster Scratch (gray w/black), and finish coats (white) and paint	Above "new" ceiling S wall, Rm 84d 17-, taken from EB204-A33	None Detected, both layers
EB204-A34	Plaster patch (white) with gray-green ceiling grid mastic of "new" grid	At "new" ceiling S wall, Rm 84d 17-	None Detected plaster, 0.5% Chrysotile in grid mastic
EB204-A35	"Old" Tan ceiling grid mastic	Above "new" ceiling on plaster, Rm 84d	1.3% Chrysotile
EB204-A36	Gypsum wall board paper & joint compound, no paint	Above Marlite paneling, W wall of Rm 84c, instrument storage	1.5% Chrysotile in joint compound
EB204-A37	Brown mastic to chalk board w/foil	N wall of Rm 83, vinyl wall board, 17-1543	1.2% Chrysotile
EB204-A38	Gypsum wall board paper & joint compound, no paint	Behind angled fabric sound wall, W wall of Practice Rm 83a	1.7% Chrysotile in joint compound
EB204-A39	Dark brown mastic & gray 12x12 LBRD (little bitty random dots) CGCT on wall	NE corner of Practice Rm 86d, on CMU, 17-1950	None Detected, both layers
EB204-QC4	Dark brown mastic & gray 12x12 LBRD (little bitty random dots) CGCT on wall	NE corner of Rm 86d, practice on CMU, 17-1950, taken from EB204-A39	None Detected, both layers
EB204-A40	Plaster Scratch (gray w/black), and finish coats (white) and paint	N wall of Practice Rm 86d, where tile missing, 17-1950	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB204-A41	Dark brown mastic & gray 12x12 LBRD CGCT on wall	SW corner of Practice Rm 86d, on CMU	None Detected, both layers
EB204-A42	Dark brown mastic & gray 12x12 LBRD CGCT on wall	SE corner of Practice Rm 86c, on CMU	None Detected, both layers
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1R includes samples taken in January 2004 in the TV Lab in the Benson Building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. There are no sample location drawings for this sampling.

TABLE 1R

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EA-01-04-ML	Grey sealant	East High School TV Lab	None Detected
EA-02-04-ML	Grey sealant	East High School TV Lab	None Detected
EA-03-04-ML	Grey sealant	East High School TV Lab	None Detected
EA-04-04-ML	Yellow/brown mastic	East High School TV Lab	1%-5% Chrysotile
EA-05-04-ML	Yellow/brown mastic	East High School TV Lab	3%-6% Chrysotile
EA-06-04-ML	Yellow/brown mastic	East High School TV Lab	1%-3% Chrysotile
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1S includes samples taken in October 2004 in the former Music Area and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1S

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1004-A1	Greenish concrete sacking & paint	Rm 86e Music Library at S wall	None Detected
EB1004-A2	Greenish concrete sacking & paint	Rm 86f Orches. Office at S wall	None Detected
EB1004-A3	Greenish concrete sacking & paint	Rm 86 Orchestra at N wall	None Detected
EB1004-A4	Greenish concrete sacking & paint	Rm 86 Orchestra at S wall	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1004-A5	Dk Brown rubber flooring on stair, tan carpet mastic, yellow lower mastic	Rm 86 Orchestra at N side of 2nd riser	Trace of Chrysotile in tile by point count, 0.25% Chrysotile in tan mastic
EB1004-A6	Reddish thick rubbery pad? on stair, and yellow lower mastic	Rm 86 Orchestra at N side of 2nd riser	None Detected
EB1004-A7	Plaster, gray & black gritty scratch coat, white finish coat	S wall of Rm 86g Storage at hole, 23-16:25	None Detected both layers
EB1004-A8	Plaster, gray & black gritty scratch coat, white finish coat	N wall of Rm 86h Storage	None Detected both layers
EB1004-A9	Dk Brown rubber flooring on stair, tan carpet mastic	NE corner of Rm 86h Storage, 23-16:30	None Detected both layers
EB1004-A10	Dk tan mastic to rubber floor	Same as above	0.25% Chrysotile in tan mastic
EB1004-A11	Type 1 ceiling tile, cellulose, 12x12 w 1/4 & 1/8 holes, dk brown mastic	SE side of Orchestra, 86, 23-16:40	None Detected both layers
EB1004-A12	Plaster, gray & black gritty scratch coat, white finish coat	Same as above, substrate for tile, 23-16:40	None Detected both layers
EB1004-A13	Greenish concrete sacking & paint	Rm 86h Storage at S wall	None Detected
EB1004-A14	Greenish concrete sacking & paint	Rm 86g Storage at N wall	None Detected
EB1004-A15	Dk Brown rubber flooring on stair, tan carpet mastic, yellow & red lower mastic	Rm 86 Orchestra at N side of top riser, 23-16:56	0.25% Chrysotile in rubber floor 0.25% Chrysotile in tan mastic
EB1004-A16	Reddish thick rubbery pad? on stair, and yellow lower mastic	Same as above	None Detected both layers
EB1004-A17	Type 1 ceiling tile, cellulose, 12x12 w 1/4 & 1/8 holes, dk brown mastic	SE side of Orchestra, 86	None Detected both layers
EB1004-A18	Dk Brown rubber 9x9 flooring tan carpet mastic	Rm 86d at SW corner, 23-17:00	0.25% Chrysotile in rubber floor, None Detected in tan mastic
EB1004-A19	Tan mastic to rubber flooring	Same as above	0.5% Chrysotile in tan mastic

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1004-A20	Plaster, gray & black gritty scratch coat, white finish coat	Under sample A17	None Detected both layers
EB1004-A21	Greenish concrete sacking & paint	Rm 85f Storage at N wall	None Detected
EB1004-A22	Type 2, 12x12 acoustic tile, little bitty random dots w/dk brown mastic,	Rm 85f Storage at N wall	None Detected both layers
EB1004-A23	Type 1 ceiling tile, cellulose, 12x12 w 1/4 & 1/8 holes, no mastic, nailed on	NE side of Chorus 85	None Detected
EB1004-A24	Plaster, gray & black gritty scratch coat, white finish coat	Under sample A23	None Detected both layers
EB1004-A25	Type 1 ceiling tile, cellulose, 12x12 w 1/4 & 1/8 holes, no mastic, nailed on	SE side of Chorus 85	None Detected
EB1004-A26	Acoustic "Popcorn" ceiling texture	Corridor 102, S part	None Detected
EB1004-A27	Acoustic "Popcorn" ceiling texture	Corridor 101, E end	None Detected
EB1004-A28	Acoustic "Popcorn" ceiling texture	Corridor 101, W end	None Detected
EB1004-A29	Acoustic "Popcorn" ceiling texture	Corridor 100, N end	None Detected
EB1004-A30	Plaster, gray & black gritty scratch coat, white finish coat	South exit alcove, W side exterior underside of soffit	None Detected both layers
EB1004-A31	Plaster, gray & black gritty scratch coat, white finish coat	South exit alcove, E side exterior underside of soffit	None Detected both layers
EB1004-A32	Acoustic "Popcorn" ceiling texture	Corridor 102, S vestibule	None Detected
EB1004-A33	Greenish concrete sacking & paint	Corridor 101 at S wall	None Detected
EB1004-A34	Greenish concrete sacking & paint	Rm 84c Storage at N wall	None Detected
EB1004-A35	2'x4' acoustic lay-in ceiling tile, Galaxy pattern, 3/8" & smaller fissures in semi-circular patterns	Rm 84c Storage at Center	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1T includes samples taken in December 2004 in the former Music Area and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but

are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1T

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1204-A1	Brown "Marlite" and yellow mastic, with some gyp paper	Music Dept, Rm 84c, South wall	None Detected, all 3 layers
EB1204-A2	Brown "Marlite" and yellow mastic, with some gyp paper	Music Dept, Rm 84d, West wall	None Detected, all 3 layers
EB1204-A3	Brown "Marlite" and yellow mastic, with some gyp paper	Music Dept, Rm 84a, East wall at outlet	None Detected, all 3 layers
EB1204-A4	Brown "Marlite" and yellow mastic, with some gyp paper	Music Dept, Rm 84b, West wall at base (no cove base)	None Detected, all 3 layers
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1U includes samples taken in August 2004 on the first floor of the Benson Building results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1U

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB804-A1	Tan mastic & foam carpet backing	At yellow patch, outer room, 20-1613	Mastic: 1.3% Chrysotile; Foam: None Detected
EB804-A2	Tan mastic w/sticky green	Under blue carpet, 10" from above, 20-1613	Sample not analyzed. Assumed positive, see sample EB804-A1.
EB804-A3	Tan mastic w/sticky green	Under blue carpet, at entry door	Sample not analyzed. Assumed positive, see sample EB804-A1.
EB804-A4	Dark brown cove base mastic	NW corner of outer room, by door, 20-1624	None Detected
EB804-A5	White cove base mastic, paint & paper	Added studio wall, outer room side, N elevation	None Detected
EB804-A6	White cove base mastic, paint & paper	Added studio wall, outer room side, E elevation	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB804-A7	Dark brown cove base mastic	SE corner of outer room	None Detected
EB804-A8	Joint compound	NE outer corner of added studio wall	None Detected
EB804-A9	Red mastic to sound foam	Studio, NW corner, W wall	6.9% Chrysotile
EB804-A10	Red mastic to sound foam	Studio, SW corner, W wall	Sample not analyzed. Assumed positive, see sample EB804-A9.
EB804-A11	Red mastic to sound foam	Studio, S wall, W side, 20-1648	Sample not analyzed. Assumed positive, see sample EB804-A9.
EB804-A12	Tan mastic to sound foam	Studio, S wall, W side, 20-1648	None Detected
EB804-A13	Tan mastic to sound foam	Studio, S wall, middle	None Detected
EB804-A14	Tan mastic to sound foam	Studio, S wall, SW corner	None Detected
EB804-A15	Black mastic to sound foam	Studio, E wall, SW corner	None Detected
EB804-A16	Black mastic to sound foam	Studio, E wall, SW corner	None Detected
EB804-A17	Black mastic to sound foam	Studio, E wall, SW corner, 20-1706	None Detected
EB804-A18	Gray mastic to sound foam	Studio, W wall, middle	None Detected
EB804-A19	Gray mastic to sound foam	Studio, W wall, middle	None Detected
EB804-A20	Gray mastic to sound foam	Studio, W wall, middle, 20-1709	None Detected
EB804-A21	Gypsum wall board, tape & joint compound	Studio, inside corner of NE corner	None Detected Both Layers
EB804-A22	Joint compound	Studio, Upper wall by door	None Detected
EB804-A23	2x4 ceiling tile, few 3/8 to 1/2 random fissures, 1/16" holes, gray matrix	Studio near SE corner	None Detected
EB804-A24	White duct tape	Studio, near SE corner, main duct	None Detected
EB804-A25	White duct tape	Studio, near SE corner, near reheat coil	None Detected
EB804-A26	2x4 ceiling tile, few 3/8 to 1/2 random fissures, 1/16" holes, gray matrix	Studio, West side, middle	None Detected
EB804-A27	Joint compound	Studio, NW corner, at junction to CMU	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB804-A28	Vinyl covered gyp board	Demountable partition, SW corner of Studio	None Detected Both Layers (Lab analyzed vinyl wall covering)
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1V includes samples taken in September 2005 in the old orchestra room and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for hand sketches of sample locations.

TABLE 1V

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB905-A1	Underslab vermiculite poured insulation, Gilsulate?	North east quadrant, Area 8, old orchestra room under slab	None Detected
EB905-A2	Underslab vermiculite poured insulation, Gilsulate?	North east quadrant, Area 8, old orchestra room under slab	None Detected
EB905-A3	Underslab vermiculite poured insulation, Gilsulate?	North east quadrant, Area 8, old orchestra room under slab	None Detected
EB905-A4	Underslab vermiculite poured insulation, Gilsulate?	South central quadrant, Area 8, old choir room under slab	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1W includes samples taken in July 2005 in the former Music Area and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. There are no sample location drawings for these samples.

TABLE 1W

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB705-A1	Fiberglass wall board with black mastic	Music area, southwest corner of foundation	None Detected
EB705-A2	Fiberglass wall board with black mastic	Music area, center of east wall on foundation	None Detected
EB705-A3	Black mastic	Music area, northeast corner of foundation	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1X includes samples taken in January 2002 in the original portion of the building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1X

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB102-A1	Tarry speaker box lining	Temp. IMC, ceiling SW Side	25% Chrysotile
EB102-A2	Brown cove base mastic	Temporary IMC, S wall	None Detected
EB102-A3	Roofing Debris	On ceiling tile, Temporary IMC, SW Side, under expansion joint	None Detected
EB102-A4	Gray-green ceiling tile grid mastic	Temporary IMC, SW concrete column, on GWB wrap	5% Chrysotile
EB102-A5	Concrete coating & paint	Temporary IMC, on beam	None Detected
EB102-A6	Concrete coating & paint	Temporary IMC, NW concrete column, no GWB wrap	None Detected
EB102-A7	Brown mix, cove base mastics	Temp. IMC, NW conc. column	None Detected
EB102-A8	Joint compound	Column enclosure @ SW	1.25% Chrysotile
EB102-A9	Exterior orange paint & coating	Brick SW side of Entry 6	1.75% Chrysotile
EB102-A10	Plaster ceiling, scratch & finish	Underside porch ceiling, Entry 6	None Detected
EB102-A11	Exterior orange paint & coating	Metal waffle panel, Ext of Fan 4	None Detected
EB102-A12	Gray rubbery sealant	Ext of Fan Rm. 4, waffle panel to aluminum trim joint	None Detected
EB102-A13	Exterior orange paint & coating	Metal waffle panel, Ext at center window of CR 5 at bullet hole	2.5% Chrysotile
EB102-A14	Gray rubbery sealant	Ext of CR 1, Corrugated panel to window frame joint	None Detected
EB102-A15	Ceramic coating & paint	Metal corrugated panel above window, CR 1	None Detected
EB102-A16	Exterior orange paint & coating	Brick wall, Main S entry, exterior of Band 86	1.75% Chrysotile
EB102-A17	Exterior orange paint & coating	Metal waffle panel, between windows at Admin	2.75% Chrysotile
EB102-A18	Exterior blue & orange paint & coating	Concrete upper part of Band 86	3.25% Chrysotile
EB102-A19	Upper stucco at roof fascia	At expansion joint by Admin storage room, installed with roof	None Detected
EB102-A20	Exterior blue & orange paint & coating	Brick at 5' above grade, at exp. joint by Admin storage room	1.5% Chrysotile
EB102-A21	Cream paint & coating	On CMU under window at Admin	2.5% Chrysotile
EB102-A22	Brown cove base mastic	Entry 6, by Convectore	None Detected
EB102-A23	Red paint on concrete floor	Entry 6, by interior door	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB102-A24	Gray-Green rubbery ceiling tile grid mastic	Entry 6, at top of west CMU wall	3.75% Chrysotile
EB102-A25	Lt gray fire stop & mineral wool	Above porch doors at Entry 6	None Detected
EB102-A26	Fesco Board	Above porch doors at Entry 6	None Detected
EB102-A27	White putty type sealant	Exterior wall Fan Rm. 4, at metal sandwich panels	None Detected
EB102-A28	Black tar on fiberglass duct insulation	Outside Air duct in Fan Rm. 4	10% Chrysotile
EB102-A29	Gypsum wall board, no JC	Ceiling of Fan Rm. 4	None Detected
EB102-A30	Hard fitting insulation	Broken "ell" on Heating Piping, Fan Rm. 4	15% Chrysotile 10% Amosite
EB102-A31	Black vinyl cork bd mastic	CR 1, West wall	None Detected
EB102-A32	Black chalk bd mastic & brown fiber chalk board	CR 1, west wall	None Detected
EB102-A33	Gray-green rubbery ceiling tile "L" grid mastic	Corridor 1000, S wall, W side of expansion joint @ CR 3	6.5% Chrysotile
EB102-A34	Coating & paint on concrete	Corridor 1000, beam above west side of expansion joint @ CR 3	None Detected
EB102-A35	12x12 Concealed grid ceiling tile (CGCT), 1" fissures	CR 3, North side, center of room	None Detected
EB102-A36	Gray-green rubbery ceiling tile "L" grid mastic	Former high ceiling, above 2x4 ceiling in Rm. 172	4.75% Chrysotile
EB102-A37	Gray-green rubbery ceiling tile "L" grid mastic	Corridor 1000, S wall, By Entry 6	6.0% Chrysotile
EB102-A38	Gray-green rubbery duct sealant	Main supply duct above ceiling in Admin storage room	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1Y includes samples taken in February 2002 in the original portion of the building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1Y

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB202-A1	12 X 12 glued-on ceiling tile with directional fissures, with brown mastic.	Fan Rm by IMC, ceiling to west of door.	None Detected, both layers
EB202-A2	12 X 12 glued-on ceiling tile with directional fissures, with brown mastic.	Fan Rm by IMC, ceiling above heat exchanger.	None Detected, both layers

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB202-A3	Tar Paper and cloth jacket on roof drains	Above ceiling at N end of corridor 2600	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1Z includes samples taken in March 2002 in the original portion of the building, and the Benson Building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1Z

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB302-A1	Plaster, Scratch & Finish Layers	South Entry Porch Ceiling by West light	None Detected, Both Layers
EB302-A2	Plaster, Scratch & Finish Layers	South Entry Porch Ceiling by 2nd light from West	None Detected, Both Layers
EB302-A3	Plaster, Scratch & Finish Layers	South Entry Porch Ceiling by 2nd light from East	None Detected, Both Layers
EB302-A4	White paint & other colors	At North End of East Brick Wall at inside of inside doors, South Entry	None Detected
EB302-A5	Plaster, Scratch & Finish Layers	Sprinkler Room at Hanger at South Side Ceiling	None Detected, Both Layers
EB302-A6	Plaster, Scratch & Finish Layers	Sprinkler Room, Ceiling Center, West Side	None Detected
EB302-A7	Plaster, Scratch & Finish Layers	Storage Room, Ceiling Center by South Light	None Detected, Both Layers
EB302-A8	Plaster, Scratch & Finish Layers	Storage Room, Ceiling above Door	None Detected
Two samples were inadvertently labeled EB302-A8, but are different samples and were taken on different days.			
EB302-A8	Red Gasket	Benson Bldg. Base of Sprinkler Riser NE Storage 1st floor	None Detected
EB302-A9	Hard Fitting on Sprinkler	Benson Bldg. 4" Sprinkler at end cap NE Storage 1st Floor	None Detected
EB302-A10	Hard Fitting on Cold Water	Benson, 4" galv. CW at union Cover Broken off. NE storage	None Detected
EB302-A11	Gasket at Check Valve	Benson, Sprinkler Check Valve NE Storage 1st Floor	None Detected
EB302-A12	Hard Fitting on Domestic	Benson, Boys Toilet 1st floor in sink pipe chase	None Detected
EB302-A13	Vinyl Faced Gyp Wall Board	Benson, Electrical Switch at Counseling	None Detected
EB302-A14	1/4" Gyp Underlayment	Benson, Counseling at SE corner above ceiling	None Detected
EB302-A15	Hard Fitting on Heat Pipe	Benson, Counseling, Above Ceiling	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB302-A16	Greenish Sticky Carpet Mastic with Black and White "Fixall"	Benson, Counseling, Behind Door	None Detected
EB302-A17	Brown Cove Base Mastic	Benson, Counseling, Behind Door	None Detected
EB302-A18	Brown Mastic between Vinyl GB & Gyp Underlayment	Benson, Electrical Switch Career Resource	None Detected
EB302-A19	2'x4' Ceiling Tile 3/8" and smaller random fixtures	Benson, Career Resource	None Detected
EB302-A20	Dark Brown Styrofoam/Poly Mastic	Benson, Exterior Wall of Career Resource, Above Ceiling	None Detected
EB302-A21	Hard Fitting on Heat Pipe	Benson, At Exterior Wall of Career Resource, Above Ceiling	None Detected
EB302-A22	Brown and White Cove Base Mastic	Benson, Security Office SW Corner	None Detected
EB302-A23	Sticky green and Brown and Gray Carpet Mastic	Benson, Security office SW Corner	None Detected
EB302-A24	Light Brown Styrofoam/concrete mastic	Benson, Exterior Wall of Deaf Interpreters, Above Ceiling	None Detected
EB302-A25	Dark Brown Styrofoam/Poly Mastic	Benson, Exterior Wall of Deaf Interpreters, Above Ceiling	1.2% Chrysotile
EB302-A26	White Door Filler	Storage Room by South Entry, No Label	60% Chrysotile 10% Amosite
EB302-A27	White Door Filler and Wood	Sprinkler/Storage Room by South Entry, No Label	Not Analyzed, assumed positive, see EB302-A26
EB302-A28	White Door Filler and Wood	West Door to Stage/Dressing Rm, No Label	Not Analyzed, assumed positive, see EB302-A26
EB302-A29	White Door Filler and Wood	Janitors Door by Women's Toilet. No Label	30% Chrysotile 5% Amosite
EB302-A30	Wood Door Filler	Faculty Lounge Door, No Label	None Detected
EB302-A31	Wood Door Filler	Audio Visual Storage Room, No Label	None Detected
EB302-A32	White Door Filler and Wood	East Door to Auditorium, Projection Booth	40% Chrysotile 5% Amosite
EB302-A33	12x12 Cream and Brown Floor Tile w/Black Mastic	Scene Shop Under Sink	Tile 1.5% Chrysotile Mastic None Detected
EB302-A34	Gyp, Joint Compound and Texture and Paint	Exit Walls Around Auditorium East Side, installed 1981	Non Detected
EB302-A35	Gyp, Joint Compound and Texture and Paint	Proscenium Wall, West Side, installed 1981	None Detected
EB302-A36	Cheese Cloth wrap on Pipe	Fiberglass w/plastic cover – cloth at plastic/Kraft Joint	None Detected
EB302-A37	Dark Brown Cove Base Mastic	Nurses Toilet by door	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB302-A38	Yellow Marlite Mastic and Marlite	Nurses Toilet by door	None Detected
EB302-A39	Yellow 1/4" Chip Sheet Vinyl	Nurses Toilet by door	20% Chrysotile Mastic None Detected
EB302-A40	Vinyl Gyp Board, No Joint Compound	Above Door to 1st Aid	None Detected
EB302-A41	Gyp Board, No Joint Compound	Nurses Toilet by Door Under Marlite	None Detected
EB302-A42	Cheese Cloth Wrap on Pipe	Fiberglass w/plastic cover – cloth at plastic/Kraft Joint	None Detected
EB302-A43	Joint Compound	Column in Faculty Lounge	0.2% Chrysotile
EB302-A44	Dark Brown Carpet Mastic	North-east corner of Faculty Lounge	None Detected
EB302-A45	Tan w/Gray 12x12 w/Dark Brown Mastic	Faculty Kitchen Under Stove	Tile None Detected Mastic 1.5% Chrysotile
EB302-A46	Dark Brown Carpet Mastic	Faculty Lounge by Utilidor Hatch	2.5% Chrysotile
EB302-A47	Black Chalk Board Mastic	No Frame, S Side Faculty Lounge	2.0% Chrysotile
EB302-A48	Black Chalk Board Mastic and Marker Board	No Frame, S Side Faculty Lounge	Trace of Chrysotile by Point Count
EB302-A49	Black "Marlite" Mastic & "Marlite"	Benson, Women's Faculty Toilet, by door	None Detected, Both layers
EB302-A50	Brown Cove Base Mastic	Benson, Women's Faculty Toilet 2nd flr, by door	None Detected
EB302-A51	Black "Marlite" Mastic & "Marlite"	Benson, Hall by Girls Toilet 2nd flr, Center of S. Wall	None Detected, Both layers
EB302-A52	Gypsum wall board and joint compound and paint	Benson, Elect. Rm, 2nd floor at roof ladder	None Detected, Both layers
EB302-A53	Thin Concrete Sacking & orange paint	Benson, S side of S wall of Central Stairs above ceiling	None Detected
EB302-A54	Thin Concrete Sacking & orange paint	Benson, N side of N wall of Central Stairs above ceiling	None Detected
EB302-A55	White tape on duct joint	Benson, Adjacent to N wall of Central Stairs, above ceiling	None Detected
EB302-A56	1/16" Concrete Sacking & white paint	Benson, Central Stairs, below mid landing	1.5% Chrysotile
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1AA includes samples taken in April 2002 in the former Cafeteria/Shop Wing between the Benson Building and the Pool/Gym and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. There are no sample location drawings for these samples.

TABLE 1AA

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS-412-A01	Black Door Frame Mastic	Door frame, Old Cafeteria Area	1.5% Chrysotile
EHS-412-A02	Black Door Frame Mastic	Door frame, Old Cafeteria Area	1.5% Chrysotile
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1BB includes samples taken in May 2003 the former Cafeteria/Shop Wing between the Benson Building and the Pool/Gym. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. There are no sample location drawings for these samples.

TABLE 1BB

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB502-A01	Black caulk in Window Frame	Alum frame, Old Cafeteria Area, 2nd floor upper, N Side	1.9% Chrysotile
EB502-A02	Black caulk in Window Frame	Alum frame, Old Cafeteria Area	2.3% Chrysotile
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1CC includes samples taken in August 2002 in areas affected by the work and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1CC

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB802-A1	Wood Door core	South door to Home Ec Storage	None Detected
EB802-A2	Wood Door core	Door to CR 75	None Detected
EB802-A3	Cardboard honeycomb filler, Metal Door	Door to CR 109, Benson Bldg	None Detected
EB802-A4	Gypsum board, Joint Compound, tape & paint	SW corner of Elect Rm, by Counseling 108	1.2% Chrysotile in Joint Compound, None Detected in Gyp
EB802-A5	Cardboard honeycomb filler, Metal Door	Door to Counseling 108, Benson Bldg	None Detected
EB802-A6	Cardboard honeycomb filler, Metal Door	Door to CR 113, Benson Bldg	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1DD includes samples taken in September 2002 in the Benson Building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1DD

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB902-A1	Fiberglass duct with white paper lining	Abandoned "Spunstrand" duct in floor of S. Store Rm. Benson	75% Chrysotile in lining None Detected Fiberglass
EB902-A2	Mastic & cloth "end cap"	At valve @ N. Wall, S. Store Rm, Benson Bldg	None Detected
EB902-A3	Hard fitting insulation & jacket	Above ceiling in Deaf Ed Interpreters Office, Benson	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1EE includes samples taken in January 2003 in areas affected by the work and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1EE

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB103-A1	Gray sealant at walls	Window frame in metal waffle panels, hall to Computer lab	None Detected
EB103-A2	Enamel & Paint	Former exterior wall, hall to Computer lab	None Detected
EB103-A3	Joint compound	Column in Student Store	1.2% Chrysotile in Joint Compound
EB103-A4	Gypsum wall board, vinyl face	Outside corner of Student Store	None Detected
EB103-A5	12x12 floor tile, chalk with black & gray splotches, black mastic & brown "Fixall"	Under old window wall, in hall to computer lab outside Student Store	1.3% Chrysotile in tile, 2.5% Chrysotile in black mastic, None Detected in brown floor leveler

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB103-A6	12x12 floor tile, chalk with black & gray splotches, black mastic	Student Store Storage, at base of metal shelves in NE corner	1.1% Chrysotile in tile, 2.4% Chrysotile in black mastic
EB103-A7	Gypsum wall board, vinyl face	Wall of Student Store, Academic area by Clock	None Detected
EB103-A8	Joint compound on plywood	Same as above@ ceiling trim angle, plywd over gyp wall bd	None Detected
EB103-A9	Brown carpet mastic	Under stage extension, accessed from Bsmt Dressing Room	None Detected
EB103-A10	Tack strip mastic for carpet	Audit, added carpet @ stage	None Detected
EB103-A11	Pinkish carpet mastic	Audit, added carpet @ stage	None Detected
EB103-A12	Brown carpet mastic	Auditorium at Row P	None Detected
Sample numbers A13 to A19 were skipped, following samples taken 1-18-03			
EB103-A20	1/16" gray rubber floor with yellow mastic and plywood	Dance Room @ Storage in NW Corner	None Detected, both layers
EB103-A21	1/16" tan rubber floor with light tan mastic	Same as above, under wood sleepers	None Detected, both layers
EB103-A22	1/4" tan rubber floor with light tan mastic from above layer	Same as above, bottom layer	None Detected, both layers
EB103-A23	1/16" gray rubber floor with yellow mastic and plywood	Dance Room @ stair in SE Corner	None Detected, both layers
EB103-A24	1/16" tan rubber floor with light tan mastic	Same as above, under wood sleepers	None Detected, both layers
EB103-A25	1/4" tan rubber floor with light tan mastic from above layer and thin gray mastic under	Same as above, bottom layer	None Detected, all three layers
EB103-A26	Brown cove base mastic	Dance Room on wall under stair in SE Corner	0.25% Chrysotile
EB103-A27	1/16" gray rubber floor with yellow mastic and plywood	Dance Room @ stair in SE Corner	None Detected, both layers
EB103-A28	1/16" tan rubber floor with light tan mastic and 1/4" tan rubber floor with light tan mastic from above layer, and yellowish mastic with black mastic off of concrete	Same as above, under wood sleepers, has both bottom layers	None Detected in both floors and tan mastic. 0.25% Chrysotile found in mixed yellow and black mastic
EB103-A29	Concrete sacking and paint	Concrete railing wall at stair to dance, South Wall	None Detected
EB103-A30	Concrete sacking and paint	Concrete railing wall at stair to dance, North Wall	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB103-A31	Gray/Green duct sealant	Benson Building, CR 110 at flange by splitter vane	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1FF includes samples taken in June 2002 on the exterior of the pedestrian walkway between the Benson Building and the Cafeteria and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for hand sketches of sample locations.

TABLE 1FF

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS62602-A01	Subsurface paint, yellow	West side of Archway	1.2% Chrysotile
EHS62602-A02	Subsurface paint, yellow	West side of Archway	1.2% Chrysotile
EHS62602-A03	Subsurface paint, yellow	West side of Archway	1.2% Chrysotile
EHS62602-A04	Subsurface paint, yellow	West side of Archway	1.2% Chrysotile
EHS62602-A05	Subsurface paint, yellow	West side of Archway	1.2% Chrysotile
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1GG includes samples taken in June 2002 at the south main entrance and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for hand sketches of sample locations.

TABLE 1GG

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS-6802-A1	Black tar on fiberboard	Main entrance porch, north wall 9' from floor, 5' from west wall	None Detected
EHS-6802-A2	Black tar on fiberboard	Main entrance porch, east wall 2' from floor, 1' from south end	None Detected
EHS-6802-A3	Black tar on fiberboard	Main entrance porch, west wall 3' from floor, 2' from south end	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

The following Table 1HH includes samples taken in April 2001 in the Pool/Gym area in areas affected by the work and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included as Appendix A. Refer to Appendix F for sample locations.

TABLE 1HH

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB401-A1	Textured Paint	Exterior wall of Pool Boiler/Filter Rm, by louvers	None Detected
EB401-A2	Greenish Concrete Coating	Inside pipe chase of Men's bathroom at Boiler Rm. pnl	None Detected
EB401-A3	Paint on CMU	Behind door to Boiler Rm. from Pool	None Detected
EB401-A4	Joint compound and paint	By door to lobby from Boiler Room	2.6% Chrysotile
EB401-A5	Concrete coating & paint	At pool side of door to Boiler Rm. from Pool	None Detected
EB401-A6	Joint compound, no paint	Pool Elec Rm. SE Corner	3.1% Chrysotile
EB401-A7	Greenish concrete coating	Pool Elec Rm. NW Corner	None Detected
EB401-A8	Greenish concrete coating	Pool lower fan Rm., by door	None Detected
EB401-A9	Joint compound & gyp	Ceiling of spectator hall	None Detected
EB401-A10	Concrete coating & paint	Pool 1st Aid Rm. E wall	None Detected
EB401-A11	Sand	Above clg of spectator hall	None Detected
EB401-A12	Joint compound & gyp, no paint	Pool upper fan room at underside of S wall by door	3.2% Chrysotile
EB401-A13	White, putty-like sticky insul	At cooling coil penetration of Pool AHU, upper fan Rm.	13% Chrysotile
EB401-A14	Greenish concrete coating	Near A12, at lower wall	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1II includes samples taken in July 2000 throughout the school, and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included as Appendix A. Refer to Appendix F for sample locations.

TABLE 1II

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB700-A01	Plaster ceiling, scratch and finish coat	2 nd Store Rm. at main entry, E. wall	None Detected
EB700-A02	High temperature wire insulation	2nd Store Rm. at fluorescent light	25% Chrysotile
EB700-A03	12"x12" Concealed grid ceiling tile with 1/8" and 1/16" holes/pattern	W. end of main entrance	None Detected
EB700-A04	Caulking-gray with fiberglass	W. end of main entrance, W. side of door	4.0% Chrysotile
EB700-A05	12"x12" Concealed grid ceiling tile	E. end of main entrance	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB700-A06	Plaster ceiling-scratch and finish coats	W. of main entrance, outside vestibule area/overhang	None Detected
EB700-A07	Plaster ceiling, scratch and finish	E. end of main entrance overhang	None Detected
EB700-A08	Sandy coating on concrete	E. end of main entrance overhang	None Detected
EB700-A09	Gray leveling compound and clear mastic	Under carpet inside S. entrance to Library, E. end of doorway	Trace of Chrysotile by Point Count
EB700-A10	Dark brown cove base mastic	Base coving in S. corridor below display case by Library	0.3% Tremolite
EB700-A11	Black paint and coating on concrete masonry unit	E. wall of Library under door to Fan Rm. 1	None Detected
EB700-A12	Dark gray cloth flex connector	Outlet of return Fan #18, Fan Rm. 1.	None Detected
EB700-A13	Dark green cloth flex connector	Return Fan AHU #16, Fan Rm. 1.	None Detected
EB700-A14	Dark gray mastic on duct fasteners (assumed to be a duct pin mastic)	Return air duct #15, N. side of Audit/ Library, Fan Rm. 1.	7.8% Chrysotile
EB700-A15	Fiberglass and brown coating sound lining	Return air duct #15, N. side of Audit/ Library, Fan Rm. 1.	None Detected
EB700-A16	12"x12" White ceiling tile with scattered "maze" pattern with brown mastic	N. end ceiling in small Storage area, SW corner of Library /SA#1	None Detected, Tile None Detected, brown mastic
EB700-A17	Cement fiber board	Outside Storage SA-1 at outlet	25% Chrysotile
EB700-A18	Gypsum wallboard and joint compound	Same location as EB700-A16 above tile	Joint Compound-1.3% Chrysotile Wallboard-None Detected
EB700-A19	Cement fiber board	Inside storage SA-1 at E. wall	30% Chrysotile
EB700-A20	12"x12" White ceiling tile with scattered "maze" pattern with brown mastic	Storage Room (SA#3) NW end of Library, SW corner wall, just below ceiling (same on ceiling)	None Detected, Tile None Detected, brown mastic
EB700-A21	12"x12" Off white/cream floor tile with gray smears	N. wall of Work/Copy Rm., W. end of wall near door (Rm. 180A)	Trace of Chrysotile by Point Count in floor tile, 10% Chrysotile in black mastic
EB700-A22	Black mastic on cove base	N. wall of Work/Copy Rm., W. end of wall near door (Rm. 180A)	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB700-A23	Concrete grout	Underside of stairs in the vestibule (to main corridor) in SW corner of Rm. 179	None Detected
EB700-A24	Gray sealant on door frame	S. wall near door in SW corner of Rm. 179	Trace of Tremolite by Point Count
EB700-A25	Vinyl gypsum wallboard	Area above suspended ceiling and covers wall on E. wall of Rm. 180A (Copy Rm.)	None Detected
EB700-A26	2'x4' ceiling, 3/8" & smaller fissures, galaxy	E. wall of Rm. 180A (Copy Rm.)	None Detected
EB700-A27	Plaster scratch coat remnants	Above suspended ceiling on E. wall of Rm. 180A (Copy Rm.)	None Detected
EB700-A28	Black mastic to 12" x 12" floor tile (tile not included)	Rm. 180A E. side where cabinet removed	10% Chrysotile
EB700-A29	Joint compound	Rm. 180A at edge of small Store Rm.	None Detected
EB700-A30	Hard pipe fitting and cloth cover	Rm. 180B above SW corner sink	None Detected
EB700-A31	Concrete grout	Rm. 180B above SW corner sink	None Detected
EB700-A32	Gypsum wallboard and joint compound	Corner on W. wall, N. end of Rm. 180B	Joint Compound-0.5% Chrysotile Wallboard-None Detected
EB700-A33	"Paper mâché" pipe joint insulation	NE corner of Rm. 180C	None Detected
EB700-A34	Brown cove base mastic	At corridor door of Rm. 82	None Detected
EB700-A35	Black sink undercoating	SW corner of Rm. 180B	2.3% Chrysotile
EB700-A36	Sticky brown carpet mastic	NW entry door to Library	None Detected
EB700-A37	Brown cove base mastic	N. wall of Rm. 180D	None Detected
EB700-A38	Sticky brown carpet mastic	NW corner of Library W. wall just N. of door to 180D	None Detected
EB700-A39	Plaster scratch and finish coats	N. stair to 2nd floor at soffit transition	0.75% Chrysotile
EB700-A40	Brown and white stair tread mastic	Black rubber tread, new at N. stair, top step	None Detected
EB700-A41	Brown stair stringer mastic	Black rubber stringer coving at N. stair, top step	2.5% Chrysotile
EB700-A42	9"x9" Light tan floor tile with black mastic	Store Rm. off Rm. 80 at missing tiles	6.5% Chrysotile in floor tile, 15% Chrysotile in black mastic
EB700-A43	Plaster ceiling, scratch and finish coats	Store Rm. off Rm. 80 at conduit penetration	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB700-A44	Plaster wall, scratch and finish	W. wall of Rm. 80 above ceiling	1.5% Chrysotile
EB700-A45	2'x4' Ceiling tile with 1-1/2" cross directional pink matrix	W. wall of Rm. 80 2nd ceiling above lower ceiling	None Detected
EB700-A46	Vinyl gypsum wallboard	W. wall of Rm. 80	None Detected
EB700-A47	Black sink undercoating	Rm. 80 stainless sink	3.5% Chrysotile
EB700-A48	Gray insulation pin mastic	Off sound lining inside of RA duct at RA#14	None Detected
EB700-A49	Sound lining with hardened surface	Off sound lining inside of RA duct at RA#14	None Detected
EB700-A50	Black "tar" facing	On vapor barrier on large outside air duct near outlet in 2nd flr Fan Rm.	10% Chrysotile
EB700-A51	Grayish duct pin mastic	Underside of large outside air duct in 2nd flr Fan Rm.	5.5% Chrysotile
EB700-A52	Black "tar" coating	On vapor barrier on underside of large outside air duct in 2nd flr Fan Rm.	3.0% Chrysotile
EB700-A53	Black "tar" coating	On insulation pin disk only, on side of large outside air duct in 2nd flr Fan Rm.	15% Chrysotile
EB700-A54	Black sink undercoating	Underside of sink in NE corner of Rm. 81	2.5% Chrysotile
EB700-A55	12"x12" White/gray concealed grid ceiling tile	2nd ceiling (above) in Rm. 81	None Detected
EB700-A56	12"x12" White/gray concealed grid ceiling tile	2nd ceiling (above) in Rm. 81	None Detected
EB700-A57	Dark brown mastic	Behind corkboard on E. wall of Rm. 81	2.8% Chrysotile
EB700-A58	16" marlite panels with dark brown and yellow mastics	E. wall of upper corridor outside N. door to Rm 80	None Detected, Three layers
EB700-A59	Dark black mastic - 2nd layer marlite	E. wall of upper corridor outside N. door to Rm 80	None Detected, Both layers
EB700-A60	White cement board	Corridor 4200 at alcove to Janitor, SW corner	20% Chrysotile
EB700-A61	Black carpet mastic	Corridor 4200 at alcove to Janitor at NW corner	5.8% Chrysotile
EB700-A62	Paint and coating on concrete	Corridor 4200 near N. side of doors to storage C7	None Detected
EB700-A63	Goldish tan mastic to suspended ceiling grid	Inside storage C7	4.8% Chrysotile
EB700-A64	12"x12" Ceiling tile with 1-1/2" directional fissures and brown mastic	Girls Rm. 153 at hole in ceiling	None Detected, Both layers

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB700-A65	12"x12" Ceiling tile with 3/8" & smaller fissures, galaxy pattern and brown mastic	Girls Rm. 153 at S. wall	None Detected, Both layers
EB700-A66	Vinyl faced gypsum wallboard (no joint comp.)	S. wall of 126 Dining Area at hole	None Detected
EB700-A67	Paint and coating on concrete, cream colored	Lobby outside Dining Area	6.8% Chrysotile
EB700-A68	Paint and coating on concrete, gray colored	Lobby outside Dining Area	5.5% Chrysotile
EB700-A69	Gray colored coating on concrete	Dining Area 126 above double doors	20% Chrysotile
EB700-A70	29"x58" Lay-in ceiling tile with 3/8" and small fissures, and 1/8" random holes	Dining Area 126, By entry, double doors	None Detected
EB700-A71	29"x58" Lay-in ceiling tile with 3/8" and smaller fissures, and 1/8" random holes	Center of S. side of Dining 126 at high ceiling	None Detected
EB700-A72	29"x58" Lay-in ceiling tile with 3/8" and small fissures, and 1/8" random holes	SE quadrant of Dining 126	None Detected
EB700-A73	White tape duct sealant	SE quadrant of Dining 126	None Detected
EB700-A74	29"x58" Lay-in ceiling tile with fat 3/8" fissures and fewer 1/8" holes	10 feet NE of NE corner of Rm. 125 in Dining 126	None Detected
EB700-A75	White tape duct sealant	10 feet NE of NE corner of Rm. 125 in Dining 126	None Detected
EB700-A76	Exterior concrete stucco	N. walkway, E. of E. doorway	1.5% Chrysotile
EB700-A77	Exterior concrete stucco and gray concrete panel sealant (rubbery)	N. walkway, 1st joint W. of E. doorway	2.3% Chrysotile in stucco, None Detected in gray sealant
EB700-A78	Exterior concrete stucco and black window sealant	N. walkway, 2nd window W. of 3rd door W. of E. corner	2.5% Chrysotile in stucco, 6.5% Chrysotile in black sealant
EB700-A79	Cove base mastic	On wood at N. wall of Dining 126	None Detected
EB700-A80	12"x12" Greenish tan floor tile with black mastic	Between Dining 126 and Cafeteria 120	2.8% Chrysotile in floor tile, 10% Chrysotile in black mastic
EB700-A81	Marlite and tan mastic	NE column of walkway	None Detected, both layers
EB700-A82	Paint and gray concrete coating	Benson Building, upper level on E. wall of walkway vestibule	2.5% Chrysotile

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB700-A83	Cement fiber board infill panel	At exterior window upper level at N. end of upper hall of Benson Building	10% Chrysotile
EB700-A84	Marlite and tan mastic	Benson Building lower hall at exit from NW stair	None Detected, Both layers
EB700-A85	Cement fiber board infill panel	Benson Building, lower hall at W. entrance above exterior doors	3.5% Chrysotile
EB700-A86	12"x12" Cream and black floor tile with black mastic	Benson Building, lower hall at W. entrance on floor at exterior doors	None Detected in floor tile, 2.8% Chrysotile in black mastic
EB700-A87	Exterior Stucco, orange and gray concrete panel sealants	Exterior to S. of W. entrance doors of Benson Building	2.3% Chrysotile in stucco, 3.5% Chrysotile in gray sealant
EB700-A88	Exterior Stucco and paint	Exterior at N. wing wall by W. entrance to Benson Building	2.5% Chrysotile
EB700-A89	Exterior Black rubbery sealant	At aluminum entrance doors, W. end of Benson Building	None Detected

The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).

Table 1JJ includes samples taken in December 2000 throughout the school and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1JJ

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1200-A1	Dark brown carpet mastic	SE door way to IMC	Trace of Chrysotile by point count
EB1200-A2	Dark brown carpet mastic	SE doorway to IMC	None Detected
EB1200-A3	Dark brown carpet mastic	W. side IMC at Counseling	None Detected
EB1200-A4	Dark brown carpet mastic; with gray leveling compound	SW doorway to IMC	None Detected Both Layers
EB1200-A5	Dark brown carpet mastic	SW corner of Counseling	None Detected
EB1200-A6	2 layers tarry paper underlay	SE doorway corner under maple floor	None Detected
EB1200-A7	Black mastic	SE doorway corner under maple floor on concrete	None Detected
EB1200-A8	Tarry paper and underlay and black mastic	SW corner of Counseling	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1200-A9	Dark brown carpet mastic	NE exit from IMC at corner	None Detected
EB1200-A10	Fire proofing white with mica flecks	Boiler Rm. above Boiler #2, N. end	None Detected
EB1200-A11	Fire proofing white with mica flecks	Boiler Rm. above Boiler #2, S. end	None Detected
EB1200-A12	Fire proofing white with mica flecks	Boiler Rm. above Boiler #3, S. end	None Detected
EB1200-A13	Fire proofing white with mica flecks	Boiler Rm. above Boiler #4, S. end	None Detected
EB1200-A14	Fire proofing white with mica flecks	Boiler Rm. above Boiler #4, N. end	None Detected
EB1200-A15	Concrete coating at ceiling concrete waffles	Benson Bldg. Rm. 119 B	None Detected
EB1200-A16	Tar paper and black mastic	Underlayment under wood floor, NE exit from IMC	None Detected
EB1200-A17	Light tan mastic of blue foam	Above ceiling at W. hall above N. door to Benson Bldg.	None Detected
EB1200-A18	Joint compound	Corridor 4200 at E. wall at CR 73	2.3% Chrysotile
EB1200-A19	Gray-green duct sealant	Photo Rm. 72 at exhaust duct	None Detected
EB1200-A20	Plaster, scratch and finish	Computer Rm. at Photo Lab	None Detected
EB1200-A21	Wire insulation, white and black	Store Rm. off Weight Rm.	40% Chrysotile
EB1200-A22	12"x12" Concealed grid ceiling tile with 1/8" and 1/16" random holes	Weight Rm., S. wall	None Detected
EB1200-A23	12"x12" Concealed grid ceiling tile with 1/8" and 1/16" random holes	Weight Rm., center	None Detected
EB1200-A24	12"x12" Concealed grid ceiling tile with 1/8" and 1/16" random holes	Weight Rm. by exterior door	None Detected
EB1200-A25	Black tar paper; with black mastic	Underlayment under wood floor in Weight Rm.	None Detected Both Layers
EB1200-A26	Tan textured paint and cream paint	Exterior S. of Weight Rm. door	3.2% Chrysotile
EB1200-A27	Tan textured paint and blue paint	At column N. of Weight Rm. door	Sample not analyzed, assumed positive. See EB1200-A26

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1200-A28	Tan textured paint and cream paint	Exterior wall of Boiler Rm.	Sample not analyzed, assumed positive. See EB1200-A26
EB1200-A29	Plaster scratch and finish	Above ceiling at 4200 at ramp	None Detected
EB1200-A30	12"x12" ceiling tile ¼" fissures, circular pattern; with brown mastic	Janitor C11 at NE	None Detected Both Layers
EB1200-A31	Plaster scratch and finish	Ceiling of vestibule of Cafeteria Bldg.	None Detected
EB1200-A32	Black mastic	On concrete wall of mixing chamber of Fan Rm. 11	None Detected
EB1200-A33	Fesco board; with black mastic	On concrete wall of mixing chamber of Fan Rm. 11	None Detected Both Layers
EB1200-A34	Fesco board; with black mastic	On exterior concrete wall of Fan Rm. 11	None Detected Both Layers
EB1200-A35	Joint compound; with gypsum wallboard	S. wall of Fan Rm. 11 ~5x5 also 50 SF at exterior	JC: 1.5% Chrysotile; GWB: None Detected
EB1200-A36	Cream textured paint at exterior on concrete	Outside door to Fan Rm. 11	2.1% Chrysotile
EB1200-A37	Yellow carpet mastic	On wood ramp-Corr. 7100	None Detected
EB1200-A38	White cove base mastic	On wood ramp-Corr. 7100	None Detected
EB1200-A39	Red duct seal	At exhaust duct above Fan #26-Cafeteria lower level	2.0% Chrysotile
EB1200-A40	White tape duct seal	At exhaust duct above Fan #26-Cafeteria lower level	None Detected
EB1200-A41	Chalky insulation and cheese cloth	Heat supply under Fan #27, Cafeteria lower level	None Detected
EB1200-A42	Chalky insulation and cheese cloth	Heat supply under Fan #28, Cafeteria lower level	None Detected
EB1200-A43	Black tar with silver paint	Electric closet 64 at S. wall adjacent to CR 59	None Detected
EB1200-A44	Sectioned "ell" insulation with cheese cloth	Roof Drain line in Rm. 55	None Detected
EB1200-A45	Black tar sound lining	Clock enclosure at Rm. 55	10% Chrysotile
EB1200-A46	12"x12" Cream with gray floor tile; with black mastic	By pipe in Store Rm. between 55 and 57	FT: None Detected; Mastic: Not analyzed due to insufficient mastic
EB1200-A47	Brown cove base mastic	W. side of Store Rm. between 55 and 57	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1200-A48	12"x12" Cream and gray floor tile; with black mastic	W. side of Store Rm. between 55 and 57	None Detected Both Layers
EB1200-A49	Gray patching on concrete	Vest. 98 outside Firing Range,	None Detected
EB1200-A50	Scrapings from concrete ceiling	Firing Range below Store Rm.	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1KK includes samples taken in January 2001 in the Benson Building and around the former Library and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1KK

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB101-A1	12" x 12" ceiling tile, grey matrix with 2" directional fissures; with brown mastic	North end of Corridor 4000	None Detected Both Layers
EB101-A2	12" x 12" ceiling tile, grey matrix with 2" directional fissures; with brown mastic	South end of Corridor 4000	None Detected Both Layers
EB101-A3	Plaster, scratch and finish coat	North wall of Upper Fan Room by Room 80	None Detected
EB101-A4	Plaster, scratch and finish coat	North wall of Classroom 81 Electrical Closet	3.2% Chrysotile
EB101-A5	12" x 24" concealed grid ceiling tile, maze pattern	Phone Closet by Classroom 71	None Detected
EB101-A6	Vinyl-covered gypsum wall board	Phone Closet by Classroom 71	None Detected Both Layers (Lab analyzed vinyl covering)
EB101-A7	Gypsum wall board; with joint compound	Store Room in Classroom 71	None Detected Both Layers
EB101-A8	Textured finish on metal panel	North exterior side of Classroom 80 to the east of new louver	1.7% Chrysotile
EB101-A9	Brown paper underlayment	Under center of exterior metal siding on north side of Classroom 80	None Detected
EB101-A10	Textured finish on metal panel	Under center of exterior metal siding on north side of Classroom 80	Sample not analyzed, assumed positive. See EB101-A8

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB101-A11	Textured finish on metal panel	North exterior side of Classroom 80 near northeast corner	Sample not analyzed, assumed positive. See EB101-A8
EB101-A12	Brown paper underlayment	Under exterior metal siding on north exterior side of Classroom 80 to the east of new louver	None Detected
EB101-A13	Brown cove base mastic	West side of door to Classroom 71 in Corridor 3000	None Detected
EB101-A14	Hardboard; with yellow mastic	West side of door to Classroom 71 in Corridor 3000	None Detected Both Layers
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1LL includes samples taken in February 2001 in the Benson Building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1LL

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB201-A1	Dark brown sticky carpet mastic	Lower Benson Building near center of west wall in Room 113	None Detected
EB201-A2	Dark brown sticky carpet mastic	Lower Benson Building by door to Room 113	2% Chrysotile
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 1MM lists the samples taken in May 2000 in the former Cafeteria/Shop Wing between the Benson Building and the Pool/Gym, and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 1MM

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB500-A1	Fiberglass and Kraft jacket	Reducer insulation on cold water pipe in Shop 92	None Detected
EB500-A2	Coating on concrete	Adjacent to hand sink in Paint Shop area of Shop 92	10-15% Chrysotile

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB500-A3	Coating on concrete	Middle of W. wall in Paint Shop area of Shop 92	15-20% Chrysotile
EB500-A4	2'x4' ceiling tile with 3/8" and smaller fissures and 1/16" holes	Corridor outside Rm. 90	None Detected
EB500-A5	Fiberglass and Kraft jacket	On cold water pipe in corridor outside Shop 90	None Detected
EB500-A6	2'x4' directional (short) 1-1/4" fissures and 1/8" holes	Corridor outside Shop 92	None Detected
EB500-A7	Welding apron	Auto/Welding Shop at welding booth	60-70% Chrysotile
EB500-A8	Cheese cloth and fiberglass	Bottom of piping risers to Kitchen, above	None Detected
EB500-A9	Joint compound	N. edge of chase for plumbing in Shop 94	None Detected
EB500-A10	Grout packing	At hand sink pipe penetration of QT floor, Cafeteria West	None Detected
EB500-A11	Cement fiberboard, white and red mastic and white cove and brown cove mastic	Kitchen at dish "Micro Spray"	Board-30-50% Chrysotile White, Brown, Orange Mastics-None Detected
EB500-A12	Joint compound and gypsum wallboard	Kitchen at dish "Micro Spray"	Joint Compound-1-2% Chrysotile Wallboard-None Detected Tape-None Detected
EB500-A13	Cement fiberboard-white	At hand wash sink	15-25% Chrysotile
EB500-A14	Cement fiberboard-gray	At Break Rm. "Micro Spray"	20-30% Chrysotile
EB500-A15	Cement fiberboard-white	E. side Kitchen	30-35% Chrysotile
EB500-A16	Gray mastic to CAB	By NE door to Kitchen	10-15% Chrysotile
EB500-A17	Joint compound, gypsum wallboard and tape	Store Rm. at W. side of Kitchen	Joint Compound-Trace <1% Wallboard-None Detected Tape-None Detected
EB500-A18	Sacking on concrete	Grease Collector Rm. off Break Rm. in ASD Maintenance	20-25% Chrysotile

The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).

TABLE 1NN includes samples taken in August 1999 in the Pool/Gym Building, and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Only field sketches of sample locations are included for the samples in Appendix F. Refer to the location descriptions.

TABLE 1NN

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB899-1	Pink Fibrous	On SS DF/Spittoon in gym elec/store rm A1	1.8% Chrysotile
EB899-2	White plaster	SE corner of gym Elec/store rm A1	None Detected
EB899-3	Lt Tan Plaster	Vest to S. boys locker	None Detected
EB899-4	White texture (popcorn)	Corridor 6000 – N end 4' from East wall	None Detected
EB899-5	Plaster ceiling, scratch, finish	Corridor 6000 – N end at East wall	None Detected
EB899-6	Plaster ceiling, scratch, finish	Corridor 6000 – N end at center of exp. joint	None Detected
EB899-7	Concrete “sacking” on ceiling	Corridor 6000 outside pool entrance	1.5% Chrysotile
EB899-8	Plaster soffit, scratch, finish	Corridor 6000 outside pool entrance	None Detected
EB899-9	Popcorn ceiling	Corridor 6000 outside entrance to girls toilet	None Detected
EB899-10	Plaster ceiling, scratch, finish	Soffit by entrance to pool viewing	None Detected
EB899-11	Gasket on heat pipe flange valve	N. boys locker room	25% Chrysotile
EB899-12	Cream FRP mastic	N. boys locker room at urinal	None Detected
EB899-13	Brown mastic on Styrofoam	East wall, N. boys locker by vest.	None Detected
EB899-14	Plaster ceiling, scratch, finish	N. Boys locker room	None Detected
EB899-15	Cream FRP mastic	S. boys locker room @ urinal	None Detected
EB899-16	Red gasket on cold water TEE	S. boys locker room	None Detected
EB899-17	Tan paper under plaster	Pipe chase @ girls locker room	None Detected
EB899-18	Popcorn ceiling texture	Corridor 6000 at entrance to women's locker room	None Detected
EB899-19	Popcorn ceiling texture	Corridor 6000 above roll up door to gym	None Detected
EB899-20	Fitting on flange, cold water	Flange to CW bypass, Pool Mech Rm.	None Detected
EB899-21	Hard fitting @ flange	ELL past check valve on CW supply @ gage Pool Mech. rm.	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB899-22	Hard fitting @ flange	EII @ top of CW loop above gage Pool mech. room	None Detected
EB899-23	Gasket at check valve	CW gage loop Pool Mech Rm.	40% Chrysotile
EB899-24	Joint compound	Pool Mech. Rm. At wall to pool	None Detected
EB899-25	Gypsum board	Pool Mech. Rm. @ wall to pool at vent	None Detected
EB899-26	Boiler stack insulation	Pool Mech Rm. At outlet	None Detected
EB899-27	Boiler stack insulation	Pool Mech Rm. At 1" iron pipe near ceiling	None Detected
EB899-28	Boiler stack insulation	Pool Mech Rm. At mid of slanted piece	None Detected
EB899-29	Plaster ceiling, scratch, finish	Boys south locker rm. by towel room	None Detected
EB899-A30	White Fibrous Pipe insulation	Rm 131, north side of room at flange near floor penetration to upper floor	None Detected
EB899-A31	Brown flange gasket	On same flange as sample A31	None Detected
EB899-A32	Painted gray plaster	Upper level, Wms Shower Rm 906 outside of room 907's NE corner	None Detected
EB899-A33	Painted gray plaster	Upper level, Wms Locker Rm 926 at N end of S Partition on S wall	None Detected
EB899-A34	White outer layer of plaster	Upper level, Wms Toilet Rm 917 5' from N Wall and 5' from E Wall	None Detected
EB899-A35	Gray inner layer of plaster	Same location as A34	None Detected
EB899-A36	LCT-1, 2x4 straw weave pattern	Upper level, N Exit Corridor 902, W side near middle of wall to Men's Toilet Rm 903	None Detected
EB899-A37	LCT-1, 2x4 straw weave pattern	NW corner of Upper level, N Exit Corridor 902	None Detected
EB899-A38	LCT-1, 2x4 straw weave pattern	E wall of Upper level, N Exit Corridor 902, outside Janitor 931	None Detected
EB899-A39	LCT-2, 2x4 small dot galaxy pattern	SW corner of Upper level, S Exit Corridor 918	None Detected
EB899-A40	LCT-2, 2x4 small dot galaxy pattern	Upper level, S Exit Corridor 918, near wall to Storage 909	None Detected
EB899-A41	LCT-3, 2x4 1" fissures, cross panel	Upper level, S Exit Corridor 918, near wall to Storage 919	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

TABLE 100 includes samples taken in February and March 1999 in the former Music Area, and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project

but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for sample locations.

TABLE 100

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS-99-0202-A01	12"x12" Concealed Grid Ceiling Tile (CGCT), Orange peel texture and dots, Type 1	Room A, Orchestra Room Storage, center, 15:39	None Detected
EHS-99-0202-A02	12"x12" CGCT, Smooth w/large & small dots, Type 2	Room A, Orchestra Room Storage, center, 15:40	None Detected
EHS-99-0202-A03	12"x12" CGCT, Smooth w/ 1" fissures & dots, Type 3	Room A, Orchestra Room Storage, center, 15:41	None Detected
EHS-99-0202-A04	12"x12" CGCT, rough w/ random size symmetrical fissures, Type 4	Room A, Orchestra Room Storage, center, 15:42	None Detected
EHS-99-0202-A05	12"x12" CGCT, Orange peel texture and dots, Type 1	Room A, Orchestra Room Storage, center	None Detected
EHS-99-0202-A06	12"x12" CGCT, Orange peel texture and dots, Type 1	Room A, Orchestra Room Storage, center	None Detected
EHS-99-0202-A07	12"x12" CGCT, random dots w/asymmetrical fissures, Type 5	Room A, Orchestra Room Storage, center, 15:53	None Detected
EHS-99-0202-A08	12"x12" CGCT, random dots w/asymmetrical fissures, Type 5	Room A, Orchestra Room Storage, center	None Detected
EHS-99-0202-A09	12"x12" CGCT, random dots w/symmetrical 1" fissure, Type 6	Room A, Orchestra Room Storage, N wall, 15:55	None Detected
EHS-99-0202-A10	12"x12" CGCT, random dots w/symmetrical 1" fissure, Type 6	Room A, Orchestra Room Storage, N wall	None Detected
EHS-99-0202-A11	12"x12" CGCT, Smooth w/large & small dots, Type 2	Room A, Orchestra Room Storage, N wall	None Detected
EHS-99-0202-A12	12"x12" CGCT, rough w/ random size symmetrical fissures, Type 4	Room A, Orchestra Room Storage, N wall	None Detected
EHS-99-0202-A13	12"x12" CGCT, Smooth w/ 1" fissures & dots, Type 3	Room A, Orchestra Room Storage, center	None Detected
EHS-99-0202-A14	White cove base mastic	Room A, Orchestra Room Storage, N side of doorway	None Detected
EHS-99-0202-A15	Tan floor tile mastic	Room A, Orchestra Room Storage, SW Corner	1.3% Chrysotile
EHS-99-0202-A16	9"x9" brown w/white smears floor tile, Type 1 FT	Room A, Orchestra Room Storage, SW Corner	2.0% Chrysotile
EHS-99-0202-A17	Tan floor tile mastic	Room A, Orchestra Room Storage, N wall center	1.8% Chrysotile

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS-99-0202-A18	9"x9" brown w/white smears floor tile, Type 1 FT	Room A, Orchestra Room Storage, N wall center	2.3% Chrysotile
EHS-99-0202-A19	Tan carpet mastic	Room B, Orchestra Room Office, E doorway at center	None Detected
EHS-99-0202-A20	Brown cove base mastic	Room B, Orchestra Room Office, W doorway	None Detected
EHS-99-0202-A21	Tan carpet mastic	Room B, Orchestra Room Office, W doorway	None Detected
EHS-99-0202-A22	12"x12" CGCT, Smooth w/large & small dots, Type 2	Room B, Orchestra Room Office, ceiling by N doorway	None Detected
EHS-99-0202-A23	12"x12" CGCT, Smooth w/large & small dots, Type 2	Room B, Orchestra Room Office, ceiling by light at N doorway	None Detected
EHS-99-0202-A24	9"x9" brown w/white smears floor tile, Type 1 FT	Room B, Orchestra Room Office, W doorway	2.0% Chrysotile
EHS-99-0202-A25	Tan floor tile mastic	Room B, Orchestra Room Office, W doorway	1.5% Chrysotile
EHS-99-0202-A26	Brown cove base mastic	Room B, Orchestra Room Office, by E doorway	None Detected
EB399-1	Paint & sacking on concrete	Orchestra room, 86 at light switch by main corridor doors	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1PP includes samples taken in June 1999 in the corridors around the former Library and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for hand sketches of sample locations.

TABLE 1PP

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHB-001	Yellow cove base mastic; with brown cove base mastic	Corridor 1000 near Room 182	Yellow: None Detected; Brown: 2% Chrysotile and 4% Actinolite/Tremolite and 2% Anthophyllite
EHB-002	Brown cove base mastic	Corridor 1000 near Room 180	<1% Chrysotile and 3% Actinolite/Tremolite and 2% Anthophyllite
EHB-003	Brown cove base mastic	Corridor 3000 near Room 186	<1% Chrysotile and 5% Actinolite/Tremolite and 2% Anthophyllite

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHB-004	Yellow cove base mastic; with brown cove base mastic	Corridor 3000 near Room 178	Yellow: None Detected; Brown: 3% Chrysotile and 4% Actinolite/Tremolite and 2% Anthophyllite
EHB-005	Off-white cove base mastic; with brown cove base mastic	Corridor 4200 near Room C7	Off-white: None Detected; Brown: 4% Chrysotile and 3% Actinolite/Tremolite and 2% Anthophyllite
EHB-006	Light brown cove base mastic	In corridor near Room 180B	None Detected
EHB-007	Light brown cove base mastic	Corridor 1000 near west exit vestibule	None Detected
EHB-008	Off-white skim coat	Ceiling in Room 72	None Detected
EHB-009	Yellow ceiling tile	Ceiling near Corridor 160	None Detected
EHB-010	Gold cove base mastic; with brown cove base mastic	Corridor 1000 near Room 179	Gold: None Detected; Brown: 3% Chrysotile and 3% Actinolite/Tremolite and 2% Anthophyllite
EHB-011	Light brown cove base mastic	Corridor 1000 near Room 179	None Detected
EHB-012	SAMPLE RESULTS MISSING	Corridor 1000 near Room 179	SAMPLE RESULTS MISSING
EHB-013	SAMPLE RESULTS MISSING	Corridor near Room 89	SAMPLE RESULTS MISSING
EHB-014	Grey plaster; with red plaster; with yellow cove base mastic	Not specified	None Detected All Layers
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1QQ includes samples taken in November 1998 around the former Library area and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F sample locations.

TABLE 1QQ

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1198-1	Tan-brown cove base mastic	Room 73 by door to Phone Room	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB1198-2	Yellow 9" x 9" floor tile; with black mastic	Room 73 by door to Phone Room	FT: 1.3% Chrysotile; Mastic: Not analyzed due to insufficient mastic
EB1198-3	Tan-brown cove base mastic	North-south corridor near junction with Corridor 3000	None Detected
EB1198-4	White 12" x 12" floor tile with black smears; with black mastic; with brown mastic	North-south corridor near junction with Corridor 3000	FT: None Detected; Black: 5.5% Chrysotile; Brown: None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1RR includes samples taken in November 1997 in the original era utility tunnels and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. There are no sample location drawings for this sampling.

TABLE 1RR

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS-9711-A01	Bulk dirt at tunnel entrance	Entrance to T-1	4.0% Chrysotile and 2.5% Amosite
EHS-9711-A02	"MAG" insulation on piping	West end of T-1	1.3% Chrysotile
EHS-9711-A03	Fiberglass insulation with hard paper cover	West entrance to T-1	None Detected
EHS-9711-A04	Bulk "MAG" insulation on floor	Southwest "T" in T-1	2% Chrysotile
EHS-9711-A05	White debris/dust on wall	Southwest "T" in T-1	None Detected
EHS-9711-A06	Fiberglass insulation wrapped with black paper layer	South of west "T" in T-1	None Detected
EHS-9711-A07	"MAG" insulation on floor	Center of T-1	2.5% Chrysotile
EHS-9711-A08	New paper cover on fiberglass	At junction of T-1 and T-2	None Detected
EHS-9711-A09	"MAG" insulation on 6" pipe	At junction of T-1 and T-2	2% Chrysotile
EHS-9711-A10	"MAG" fitting insulation	East end of T-3	1.8% Chrysotile
EHS-9711-A11	Black fiberglass wall panel mastic	North-south tunnel on west side of T-3	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS-9711-A12	"MAG" fitting insulation	Southeast corner of north-south tunnel for T-3	0.5% Chrysotile and 25% Amosite
EHS-9711-A13	"MAG" debris below damaged fitting	Southeast corner of south east-west tunnel for T-3	1% Chrysotile and 35% Amosite
EHS-9711-A14	Paper cover on fiberglass insulation (cloth cover)	Southeast corner of east north-south tunnel for T-3	None Detected
EHS-9711-A15	Damaged "MAG" fitting	Northeast corner of east north-south tunnel for T-3	2% Chrysotile and 30% Chrysotile
EHS-9711-A16	Debris piles	Center of east north-south tunnel for T-4	None Detected
EHS-9711-A17	Water scaling adjacent to water leak	Northeast corner of east north-south tunnel for T-4	None Detected
EHS-9711-A18	Bulk debris and dirt floor	Northeast corner of north east-west tunnel for T-4	Trace Chrysotile and Trace Amosite
EHS-9711-A19	Tar paper between ceiling and wall	Northwest corner of north east-west tunnel for T-4	None Detected
EHS-9711-A20	"MAG" insulation	Northwest corner of west north-south tunnel for T-4	1% Chrysotile and 35% Amosite
EHS-9711-A21	Black mastic for fiberglass on wall	Southeast corner of south tunnel for T-5	None Detected
EHS-9711-A22	"MAG" inside fiberglass insulation at seam	Southwest corner of south tunnel for T-5	None Detected
EHS-9711-A23	"MAG" inside fiberglass insulation at seam	Southwest corner of south tunnel for T-5	None Detected
EHS-9711-A24	Cloth cover on 12" pipe	East end of T-7 at entrance	None Detected
EHS-9711-A25	"MAG" insulation on 8" pipe	North end of T-6	1.8% Chrysotile
EHS-9711-A26	Dust and dirt with white debris	Center of T-6	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1SS includes samples taken in December 1997 in the original era utility tunnels and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. There are no sample location drawings for this sampling.

TABLE 1SS

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS-9712-A01	Dirt and debris	Floor of utilidor in Fan Room #4	0.25% Chrysotile and 1.3% Amosite
EHS-9712-A02	Dirt and debris	Floor of utilidor at Boiler Room access	0.5% Chrysotile and Trace Amosite
EHS-9712-A03	Dirt and debris	Floor of utilidor in Fan Room #7	Trace Chrysotile and Trace Amosite
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1TT includes samples taken in September 1997 throughout the school and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for hand sketches of sample locations.

TABLE 1TT

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB929.97-1A	2' x 4' ceiling tile, small worms and dots	Hall outside of Room 03	None Detected
EB929.97-1B	2' x 4' ceiling tile, small worms and dots	Hall outside of Faculty	None Detected
EB929.97-1C	2' x 4' ceiling tile, small worms and dots	Hall outside of Room 07	None Detected
EB929.97-2A	2' x 4' ceiling tile, large dots	Hall near Room 16	None Detected
EB929.97-2B	2' x 4' ceiling tile, large dots	Hall near Room 16	None Detected
EB929.97-2C	2' x 4' ceiling tile, large dots	Hall near Room 16	None Detected
EB929.97-3A	Gypsum wall board ceiling; with joint compound	Center side of Data Closet	GWB: None Detected; JC: 1% Chrysotile
EB929.97-3B	Gypsum wall board ceiling; with joint compound	Near doorway in Data Closet	GWB: None Detected; JC: 1% Chrysotile
EB929.97-3C	Gypsum wall board ceiling; with joint compound	Southwest corner of Data Closet	GWB: None Detected; JC: 1% Chrysotile
EB929.97-4A	2' x 4' ceiling tile, large worm/dots pattern	Hall near Room 31	None Detected
EB929.97-4B	2' x 4' ceiling tile, large worm/dots pattern	Hall near Room 25	None Detected
EB929.97-4C	2' x 4' ceiling tile, large worm/dots pattern	Hall near Room 59	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB929.97-5A	12" x 12" ceiling tile, big worms/dots	Room 33	None Detected
EB929.97-5B	12" x 12" ceiling tile, big worms/dots	Room 27	None Detected
EB929.97-5C	12" x 12" ceiling tile, big worms/dots	Room 15	None Detected
EB929.97-6A	12" x 12" ceiling tile, small dots only	Room 38	None Detected
EB929.97-6B	12" x 12" ceiling tile, small dots only	Room 38	None Detected
EB929.97-6C	12" x 12" ceiling tile, small dots only	Room 38	None Detected
EB929.97-7A	2' x 4' ceiling tile, small irregular worm and small dots	Room 08	None Detected
EB929.97-7B	2' x 4' ceiling tile, small irregular worm and small dots	Room 08	None Detected
EB929.97-7C	2' x 4' ceiling tile, small irregular worm and small dots	Room 08	None Detected
EB929.97-8A	12" x 12" ceiling tile, deep worm cuts	Fan Room 08	None Detected
EB929.97-8B	12" x 12" ceiling tile, deep worm cuts	Fan Room 08	None Detected
EB929.97-8C	12" x 12" ceiling tile, deep worm cuts	Fan Room 08	None Detected
EB929.97-8D	Brittle brown glue dot for ceiling tile	Fan Room 08	None Detected
EB929.97-9A	1' x 2' ceiling tile, jigsaw	Room 73	None Detected
EB929.97-9B	1' x 2' ceiling tile, jigsaw	Room 75	None Detected
EB929.97-9C	1' x 2' ceiling tile, jigsaw	Room 77	None Detected
EB929.97-10A	2' x 4' ceiling tile, small irregular worm and 1/2" dots	Southeast corner of Audio-Video Room, marked 10A on grid	None Detected
EB929.97-10B	2' x 4' ceiling tile, small irregular worm and 1/2" dots	Southeast corner of Audio-Video Room, marked 10B on grid	None Detected
EB929.97-10C	2' x 4' ceiling tile, small irregular worm and 1/2" dots	Southeast corner of Audio-Video Room, marked 10C on grid	None Detected
EB929.97-11A	2' x 2' ceiling tile, large irregular shaped dots	East end of breezeway between East & Benson buildings	None Detected
EB929.97-11B	2' x 2' ceiling tile, large irregular shaped dots	East end of breezeway between East & Benson buildings	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB929.97-11C	2' x 2' ceiling tile, large irregular shaped dots	East end of breezeway between East & Benson buildings	None Detected
EB929.97-12A	2' x 4' ceiling tile, large irregular shaped dots	Room 104	None Detected
EB929.97-12B	2' x 4' ceiling tile, large irregular shaped dots	Room 104	None Detected
EB929.97-12C	2' x 4' ceiling tile, large irregular shaped dots	Room 104	None Detected
EB929.97-13A	Spray-on acoustical "popcorn" ceiling texture	North end of Hallway	None Detected
EB929.97-13B	Spray-on acoustical "popcorn" ceiling texture	Center of Hallway	None Detected
EB929.97-13C	Spray-on acoustical "popcorn" ceiling texture	South end of Hallway adjacent to light fixture	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1UU includes samples taken in June 1997 in the former Library and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for hand sketches of sample locations.

TABLE 1UU

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB697-1	2' x 2' recessed/pitted ceiling tile	At slanted section on south side of Library	None Detected
EB697-2	2' x 2' recessed/pitted ceiling tile "clean" appearance	At sprinkler head on southeast side of Library	None Detected
EB697-3	2' x 2' recessed/pitted ceiling tile	At slanted section on north side of Library	None Detected
EB697-4	2' x 2' recessed/pitted ceiling tile	Between smoke detector and sprinkler on northwest side of Library	None Detected
EB697-5	2' x 2' recessed/pitted ceiling tile "clean" appearance	West wall of Library above biographies	None Detected
EB697-6	2' x 2' recessed/pitted ceiling tile	20' west of fan room hatch in Library	None Detected
EB697-7	2' x 2' recessed/pitted ceiling tile "clean" appearance	35' from south door, 30' from east wall in Library	None Detected
EB697-8	2' x 2' recessed/pitted ceiling tile	Center of Library with 2" x 3" square hole in edge	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1VV includes samples taken in March 1997 in the Admin area and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for hand sketches of sample locations.

TABLE 1VV

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB397-1	Gypsum wall board; with joint compound	Electrical Room in Administration area behind door	GWB: None Detected; JC: <1% Chrysotile
EB397-2	2' x 4' ceiling tile, 3/4" directional fissures with 1/16" holes	Electrical Room in Administration area, main tile type	None Detected
EB397-3	12" x 12" glued-on ceiling tile, 1/16" and 1/8" holes	Administration area above roll-up door	None Detected
EB397-4	Cove base mastic	On CMU by door east of roll-up door in Administration area	None Detected
EB397-5	12" x 12" ceiling tile, short 1/2" fissures	Administration area west of roll-up doors	None Detected
EB397-6	12" x 12" glued-on ceiling tile, 1/16" and 1/8" holes	Toilet Vestibule in Administration area	None Detected
EB397-7	2' x 4' ceiling tile, short 1/2" fissures in circular pattern	Replacement tile in Administration area Electrical Room	None Detected
EB397-8	2' x 4' ceiling tile, 3/4" directional fissures with 1/16" holes	Electrical Room in Administration area	None Detected
EB397-9	9" x 9" grey-brown floor tile; with black mastic; with grey plaster	Electrical Room in Administration area	FT: 4% Chrysotile; Mastic: 5% Chrysotile; Plaster: None Detected
EB397-10	12" x 12" glued-on ceiling tile, 1/16" and 1/8" holes	West exit hall from Administration area	None Detected
EB397-11	Electrical wire insulation	At light in Activities Work Room	20% Chrysotile
EB397-12	Brown cove base mastic on CMU	Activities Work Room, northwest corner	None Detected
EB397-13	Cream 12" x 12" floor tile; with dark brown mastic; with light brown carpet mastic	Northwest corner of Activities Work Room	None Detected All Layers
EB397-14	Grey floor tile; with black mastic	Northwest corner of Activities Work Room	FT: 3% Chrysotile; Mastic: 3% Chrysotile
EB397-15	Plaster finish coat	Administration Toilet Room under sink	None Detected
EB397-16	Dark brown carpet mastic	Alcove by vault on grey-brown tile	None Detected

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EB397-17	2' x 4' ceiling tile, circular 3/4" fissures	Hallway stairs east of Administration	None Detected
EB397-18	Vinyl-faced gypsum wall board	Hallway stairs east of Administration	None Detected
EB397-19	2' x 4' ceiling tile, circular 3/4" fissures	East Meeting Room	None Detected
EB397-20	Plaster ceiling scratch coat and finish coat	Fan Room #1 by Library	None Detected
EB397-21	Fiberglass and tan outside air duct insulation	Fan Room #1, Fan #19	None Detected
EB397-22	Flex connector on supply air, cloth	Fan Room #1, Fan #19	None Detected
EB397-23	Fiberglass and tan outside air duct insulation	Fan Room #1, Fan #19	None Detected
EB397-24	Flex connector on outside air, cloth	Fan Room #1, Fan #19	None Detected
EB397-25	Flex connector on return air, neoprene	Fan Room #1, Fan #19	None Detected
EB397-26	2' x 2' ceiling tile, deep fissures	Library ceiling	None Detected
EB397-27	2' x 4' ceiling tile 3/8" small circular fissures	Corridor by Library	None Detected
EB397-28	2' x 4' ceiling tile, directional 3/4" fissures with 1/16" holes	Corridor by Library	None Detected
EB397-29	2' x 4' ceiling tile 3/8" small circular fissures	Corridor by Library	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1WW includes samples taken in February 1997 the original portions of the building and the Benson Building and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for hand sketches of sample locations.

TABLE 1WW

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EA01-97	Gypsum wall board; with joint compound	1960 Prop Room, middle column	Trace Chrysotile (Note, composite analysis)
EA01-97A	Gypsum wall board	1960 Prop Room, middle column	None Detected
EA01-97B	Joint compound	1960 Prop Room, middle column	Trace Chrysotile

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EA02-97	Gypsum wall board; with joint compound	1960 Prop Room, south column	Trace Chrysotile (Note, composite analysis)
EA02-97A	Gypsum wall board	1960 Prop Room, south column	None Detected
EA02-97B	Joint compound	1960 Prop Room, south column	Trace Chrysotile
EA03-97	Joint compound	1960 Prop Room, south column	Trace Chrysotile
EA04-97	Grey TSI, pipe elbow	1960 Custodial Closet at Room 01	8% Chrysotile and 12% Amosite
EA05-97	Grey TSI, pipe elbow	1960 Custodial Closet at Room 01	8% Chrysotile and 12% Amosite
EA06-97	Grey spray-on fireproofing	Mechanical Room 201	Trace Amosite
EA07-97	Grey spray-on fireproofing	Mechanical Room 201	None Detected
EA08-97	Grey spray-on fireproofing	Mechanical Room 201	Trace Amosite
EA09-97	Grey spray-on fireproofing	Mechanical Room 201	None Detected
EA10-97	Grey spray-on fireproofing	Mechanical Room 201	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1XX includes samples taken in June 1996 in the Boiler Room and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. There are no sample location drawings for this sampling.

TABLE 1XX

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EAST-9706-A01	White "MAG" insulation on fiberglass piping insulation	South of south boiler below top of FTG	15% Chrysotile
EAST-9706-A02	White "MAG" insulation on fiberglass piping insulation	South of south boiler below side of FTG	None Detected
EAST-9706-A03	White "MAG" insulation on fiberglass piping insulation	South of north boiler below top of FTG	5% Chrysotile
EAST-9706-A04	White "MAG" insulation on fiberglass piping insulation	South of north boiler below side of FTG	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EAST-9706-A05	White "MAG" insulation on fiberglass piping insulation	North of north boiler below top of FTG	None Detected
EAST-9706-A06	White "MAG" insulation on fiberglass piping insulation	Bottom of fitting above northwest pump, bottom of FTG	None Detected
EAST-9706-A07	White "MAG" insulation on fiberglass piping insulation	South of FTG above west end of north boiler	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1YY includes samples taken in December 1996 in the Boiler Room and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for hand sketches of sample locations.

TABLE 1YY

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EAST-01	White "mag" insulation	Boiler stack #2 under metal cover	15% Chrysotile
EAST-02	White "mag" insulation	Boiler stack #1 under metal cover	15% Chrysotile
EAST-03	White "mag" insulation FTG insulation	Under fiberglass insulation on fitting south of boiler #1	None Detected
EAST-04	White cloth gasket	On back of boiler #1 at metal cover	30% Chrysotile
EAST-05	Cloth cover over fiberglass	Insulation on tank behind boiler #2	None Detected
EAST-06	Tan spray-on fireproofing	On beams and deck on ceiling	None Detected
EAST-07	Grey base coat of plaster	On metal lathe on west wall of Upper Boiler Room	None Detected
EAST-08	Red fibrous pipe flange gasket	On circulation pumps in Upper Boiler Room	35% Chrysotile
EAST-09	Old black roof mastic	On floor south of boiler stack #1	None Detected
EAST-10	White "MAG" insulation	Under fiberglass insulation at fitting by pumps in Upper Room	None Detected
EAST-10 (QC)	White "MAG" insulation	Under fiberglass insulation at fitting by pumps in Upper Room	None Detected
EAST-11	Dark brown cove base mastic	South wall of Upper Room	Trace Actinolite and trace Tremolite
EAST-12	Hard white boiler cement	North side of boiler #3 (hole in boiler) and debris on floor	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EAST-12 (QC)	Hard white boiler cement	North side of boiler #3 (hole in boiler) and debris on floor	None Detected
EAST-13	White hard "MAG" pipe insulation	In Lower Boiler Room at northeast corner above catwalk	15% Chrysotile
EAST-14	White plaster finish coat	Lathe and plaster on west wall of Upper Room	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

Table 1ZZ includes samples taken in August 1996 in original era restrooms and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included in Appendix A. Refer to Appendix F for hand sketches of sample locations.

TABLE 1ZZ

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EHS-9608-A01	White tile plaster (top coat)	Men's Restroom wall by Room 83	None Detected
EHS-9608-A02	Grey tile plaster (basecoat)	Men's Restroom wall by Room 83	None Detected
EHS-9608-A03	White tile plaster (top coat)	Women's Restroom wall by Room 83	None Detected
EHS-9608-A04	Grey tile plaster (basecoat)	Women's Restroom wall by Room 83	None Detected
EHS-9608-A05	White tile plaster (top coat)	Men's Restroom wall by Room 69	None Detected
EHS-9608-A06	Grey tile plaster (basecoat)	Men's Restroom wall by Room 69	None Detected
EHS-9608-A07	Grey tile plaster (basecoat)	Men's Restroom wall by Room 69	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

The following Table 1AAA lists the samples taken in the Pool/Gym area in February 1995 during an AHERA inspection, and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included as Appendix A. Refer to Appendix F for sample locations.

TABLE 1AAA

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
ES01	2' x 4' ceiling tile	Art Building, Room 51	None Detected

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
ES02	2' x 4' ceiling tile	Art Building, entrance to Rooms 57 and 53	None Detected
ES03	2' x 4' ceiling tile	Art Building, Room 53	None Detected
ES04	2' x 4' ceiling tile	Art Building, Room 53	None Detected
ES05	2' x 4' ceiling tile	Art Building, Room 55	None Detected
ES06	2' x 4' ceiling tile	Art Building, Room 55	None Detected
ES07	2' x 4' ceiling tile	Art Building, entrance to Rooms 55 and 57	None Detected
ES08	2' x 4' ceiling tile	Art Building, entrance to Rooms 55 and 57	None Detected
ES09	2' x 4' ceiling tile	Upper Cafeteria	None Detected
ES10	2' x 4' ceiling tile	Upper Cafeteria	None Detected
ES11	2' x 4' ceiling tile	Upper Cafeteria	None Detected
ES12	2' x 4' ceiling tile	Upper Cafeteria	None Detected
ES13	2' x 4' ceiling tile	Cafeteria Building, lower level corridor	None Detected
ES14	2' x 4' ceiling tile	Cafeteria Building, lower level corridor	None Detected
ES15	2' x 4' ceiling tile	Cafeteria Building, lower level corridor	None Detected
ES16	2' x 4' ceiling tile	Cafeteria Building, lower level corridor	None Detected
ES17	Spray-on insulation	Lower Gym, southeast side	None Detected
ES18	Spray-on insulation	Lower Gym, southcentral section	None Detected
ES19	Spray-on insulation	Lower Gym, southcentral section	None Detected
ES20	Spray-on insulation	Lower Gym, southeast section	None Detected
ES21	Spray-on insulation	Lower Gym, northeast section	None Detected
ES22	Spray-on insulation	Lower Gym, northcentral section	None Detected
ES23	Spray-on insulation	Lower Gym, northwest side	None Detected
ES24	Spray-on insulation	Lower Gym, northwest side	None Detected

The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).

The following Table 1BBB lists the samples taken in the Pool/Gym area in June 1990 during an AHERA inspection, and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos field survey data sheets and laboratory reports are included as Appendix A. Refer to Appendix F for hand sketches of sample locations.

TABLE 1BBB

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
EH-1	Beige vinyl asbestos tile; with black mastic	Dance Studio and East Door (Note, not shown on sample location drawings)	Floor tile: 1%-2% Chrysotile; Mastic: 3%-6% Chrysotile
EH-2	Beige vinyl asbestos tile; with black mastic	Dance Studio and North Door (Note, not shown on sample location drawings)	Floor tile: 1%-2% Chrysotile; Mastic: 4%-8% Chrysotile
EHS-1	Plaster	Fan Room above Library	5-10% Chrysotile
EHS-2	Plaster	Fan Room above Library	Not Analyzed- See sample EHS-1
EHS-3	Tarry wall coating	Fan Room by Art Area	None Detected
EHS-4	Tarry wall coating	Fan Room by Art Area	None Detected
EHS-5	Tarry wall coating	Fan Room by Art Area	None Detected
EHS-6	Plaster	Corridor/Vestibule southeast of Art Area	Not Analyzed- See sample EHS-1
EHS-7	Plaster	Auditorium Dressing Room	Not Analyzed- See sample EHS-1
EHS-8	Cement asbestos board	West side of Library	20-25% Chrysotile
EHS-9	Fireproofing	Second floor Fan Room on north side of Benson Building	None Detected
EHS-10	Plaster	North side of Boiler Room	Not Analyzed- See sample EHS-1
EHS-11	Plaster	Toilet Room south of Library	None Detected
EHS11Q	Grey plaster	Toilet Room south of Library	None Detected
EHS-12	Spray-on insulation	Southwest side of Lower Gym	None Detected
EHS-13	Spray-on insulation	Upper Gym	None Detected
EHS-A	Ceiling texture	North side of Pool Lobby	None Detected
EHS-B	Ceiling texture	Near center of Pool Lobby	None Detected
EHS-C	Ceiling texture	South side of Pool Lobby	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

The following Table 1CCC lists the samples taken throughout the building in September 1983 during the original AHERA inspections and the results of the laboratory analysis. Note, some of these materials may have been removed by the previous project but are included here to illustrate similar materials from the eras of construction. Asbestos laboratory reports are included as Appendix A. There are no asbestos field data sheets or sample location drawings for this sampling.

TABLE 1CCC

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
AK252	Roof drain material, beige powder with fibers	Storage Room in Benson, middle of upper level	None Detected
AK253	Pipe fittings, grey powder with fibers	Fan Room above Library	10% Chrysotile and 1% Amosite
AK256	Ceiling material, white fibrous spongy material	Pool area	None Detected
AK258	Roof drain material, beige powder with fibers	Storage Room in Benson, middle of upper level	None Detected
AK263	Pipe fittings, beige powder with fibers	New Boiler Room	5% Chrysotile and 5% Amosite
AK266	Pipe fittings, grey powder with fibers	Old Boiler Room	5% Chrysotile
AK268	Ceiling material, beige powder with fibers and flakes	New Boiler Room	None Detected
AK276	Storage tank insulation. White powder with long stiff fibers	Old Boiler Room	5% Chrysotile and 20% Amosite
AK281	Pipe fittings, grey fibrous material	Tunnel at entrance outside Auditorium	20% Chrysotile and 5% Amosite
AK282	Ceiling material, white clumpy material with fibers	Foyer outside Pool	5% Chrysotile
AK283	Pipe fittings, grey clumps of material	Pipe chase on lower floor of Benson	None Detected
AK285	Storage tank insulation, white fibrous material	Fan Room across from Room 67	50% Chrysotile and 10% Amosite
AK286	Pipe fittings, grey fibrous material	New Boiler Room	15% Chrysotile and 5% Amosite
AK290	Cementitious material, grey clumps of material	New Boiler Room	None Detected
AK296	Pipe fittings, light grey powder with clumps and fibers (some black fibers)	Tunnel at entrance outside Auditorium	8% Chrysotile and 5% Amosite
AK297	Storage tank insulation, white fluffy powder with fibers	Old Boiler Room	30% Chrysotile and 15% Amosite
AK299	Cementitious material, light grey powder with fibers	New Boiler Room	1% Chrysotile
AK300	Storage tank insulation, white powder with fibers	Fan Room across from Room 10	10% Chrysotile and 40% Amosite
AK309	Pipe fittings, grey powder with fibers	Fan Room above Library	7% Chrysotile and 3% Amosite
AK312	Storage tank insulation, white powder with fibers	Fan Room across from Room 67	10% Chrysotile and 30% Amosite

SAMPLE NUMBER	MATERIAL	LOCATION	ASBESTOS CONTENT
AK403	Welding aprons and gloves, white fibrous string-like material	Mechanical Shop	90% Chrysotile
AK410	Ceiling material, tan fibrous powdery material	New Boiler Room	None Detected
AK416	Pipe fittings, grey fibrous material	Old Boiler Room	12% Chrysotile
AK423	Kiln, brown sandy material	Mechanical Shop	Trace Chrysotile
AK430	Storage tank insulation, fluffy white fibrous material	Fan Room across from Room 10	20% Chrysotile and 20% Amosite
AK441	Firebrick, yellow-blue mortar	Mechanical Shop	None Detected
AK442	Ceiling material, white powder	Foyer outside Pool	2% Chrysotile
AK443	Ceiling material, white fluffy cottony material	Pool area	None Detected
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

The following materials have been found in Bettye Davis East Anchorage High School to contain asbestos in this or previous surveys or were assumed to contain asbestos. Note, many portions of this school have been extensively renovated, and many of the materials described below have been at least partially removed from the school. Appendix F contains floor plans describing a generalized renovation history of the school. Refer to as-built documentation for detailed information about these previous renovations. Many of these materials are unlikely to be disturbed by this project but are noted here as part of the contractor's hazards communication program.

1. Various colors and patterns of 9" x 9" and 12" x 12" vinyl asbestos tile and associated asbestos-containing black and tan (1960 only) flooring mastics (confirmed asbestos-containing in the 1960, 1972, and 1973 eras, assumed in the 1974 era).
2. Sheet vinyl (confirmed asbestos-containing in the 1960 era, assumed asbestos-containing in the 1972, 1973, and 1974 eras) with assumed asbestos-contaminated mastic.
3. Carpet mastic (confirmed asbestos-containing in the 1960, 1973, and 1974 eras).
4. Black rubber stair treads, risers, and stringers (confirmed asbestos-containing in the 1972 and 1973 eras).
5. Dark brown rubber flooring and associated dark tan mastic (confirmed asbestos-containing in the 1960 era, believed to have been removed by previous projects).
6. Gypsum board systems (walls, ceilings, soffits, etc.) with asbestos-containing joint compound (confirmed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).
7. Plaster (confirmed asbestos-containing in the 1960 era, believed to have been removed by previous projects).
8. White and grey cementitious "sacking" materials on concrete (confirmed asbestos-containing in the 1972 and 1973 eras). NOTE: Finish material found to be ACM on concrete wall of Boys Bathroom in Music area (now removed) is believed to be patching with a joint compound. Twelve other samples of concrete sacking in the original construction did not contain asbestos.
9. Cement asbestos board finish materials (confirmed asbestos-containing, 1960, 1972, 1973, and 1974 eras).
10. Cement asbestos board insulated sandwich infill panels at exterior windows (confirmed asbestos-containing in the 1960, 1972, 1973, and 1974 eras, and reused in the 1992 era).

11. Cement asbestos board infill panels at interior windows and doors (assumed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).
12. Cement asbestos board on "roof break" (assumed asbestos-containing in the 1974 era).
13. Mastics for cement asbestos products (confirmed asbestos-containing in the 1972 era, assumed asbestos-containing or asbestos-contaminated in the 1960, 1973, and 1974 eras).
14. Brown mastic on rubber cove bases and stair stringers (confirmed asbestos-containing in the 1960 era).
15. Various colors (yellow, grey, tan, grey-green) of ceiling grid "L" channel mastic of 2' x 2' and 2' x 4' suspended ceiling systems and on 12" x 12" concealed grid ceilings systems (confirmed asbestos-containing in the 1960, 1972, and 1974 eras). No ceiling grid "L" channel mastic has been observed in the 1973 era to date.
16. Mastics for chalk boards, marker boards, tack boards, bulletin boards (confirmed asbestos-containing in the 1960, assumed asbestos-containing in the 1972 and 1974 eras), and mirrors (assumed asbestos-containing in the 1960, 1972, and 1974 eras). None of these types of mastics have been observed in the 1973 era to date.
17. Red mastic for sound foam in the "TV Lab" (confirmed asbestos-containing in the 1973 era).
18. Black tarry dampproofing on interior face of exterior concrete walls (confirmed asbestos-containing in the 1974 era, assumed asbestos-containing in the 1960). Black tarry dampproofing materials on interior face of exterior concrete walls has not been observed in the 1972 or 1973 era to date.
19. Mastics used to secure Styrofoam insulation (confirmed asbestos-containing in the 1972 and 1973 eras, assumed asbestos-containing in the 1960 and 1974 eras), and other types of insulation (assumed asbestos-containing in the 1960, 1972, 1973, and 1974 eras) to exterior concrete walls.
20. Remnants of asbestos-containing fireproofing and overspray in the fan rooms of the Benson Building (confirmed asbestos-containing in the 1973 era).
21. "Hard fitting" insulation on pipe fittings (fiberglass insulation on runs) of heating, domestic hot and cold water piping, and roof drain piping (confirmed asbestos-containing in the 1960 and 1972 eras, not found to contain asbestos in the 1973 era, and not observed in the 1974 era).
22. "MAG" insulation on mechanical components (confirmed asbestos-containing in the 1960 era, mostly removed but may be in some concealed locations).
23. Insulation of abandoned heating and plumbing piping under 1960 era slab (assumed asbestos-containing in the 1960 era).
24. Duct pin mastic on insulated outside air intakes (confirmed asbestos-containing in the 1960 and 1973 eras, assumed asbestos-containing in the 1972 era and not observed in the 1974 era to date).
25. Duct pin mastics on ductwork sound linings (confirmed asbestos-containing in the 1960 era, assumed asbestos-containing in the 1972, 1973, and 1974 eras).
26. Duct seam sealants (confirmed asbestos-containing in the 1972 era, assumed asbestos-containing in the 1960, not found to contain asbestos in the 1973 era, and not observed in the 1974 era to date).
27. Black tarry coating on outside air ductwork (confirmed asbestos-containing in the 1960 era).
28. Sealants on air handling units (assumed asbestos-containing in the 1960, 1972, not found to contain asbestos in the 1973 era, and not observed in the 1974 era to date).
29. Paper-like lining of abandoned under-slab fiberglass ductwork (confirmed asbestos-containing in the 1973 era).
30. Flange gaskets and valve packings on piping (confirmed asbestos-containing in the 1972 era, assumed asbestos-containing throughout all other eras).
31. Black chemical resistant laboratory countertops, sinks, and backsplashes (assumed asbestos-containing in the 1960 era).
32. White insulating cores of unlabeled wood doors (confirmed asbestos-containing in the 1960 era).
33. Black tarry sound lining inside of clock/speaker box housings (confirmed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).
34. Pink undercoating on the bottom of stainless steel drinking fountains (confirmed asbestos-containing in the 1972 and 1973 eras), and various other colors of undercoatings of stainless steel drinking fountains (assumed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).

35. Black undercoating on the bottom of stainless steel sinks (confirmed asbestos-containing in the 1960 and 1972 eras), and various other colors of undercoatings of stainless steel sinks (assumed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).
36. White sealants around exterior doors (confirmed asbestos-containing in the 1960 era).
37. Grey sealant on interior door frames (confirmed traces of asbestos in the 1960 era, assumed to contain greater than 1% asbestos if analyzed by TEM NOB).
38. Black tarry sound lining inside of hollow metal door frames (confirmed asbestos-containing in the 1972 era).
39. Exterior window sealants, caulking, and glazing compounds (confirmed asbestos-containing in the 1972 and 1974 eras, not found to contain asbestos in the 1973 era, and assumed asbestos-containing in the 1960 era).
40. Penetration putties (confirmed asbestos-containing in the 1972 era, assumed asbestos-containing in the 1960, 1973, and 1974 eras).
41. High temperature wiring insulation in older fluorescent light fixtures (confirmed asbestos-containing in the 1960 era).
42. High temperature wiring insulation and heat shields in older incandescent light fixtures (assumed asbestos-containing in the 1960 era).
43. High temperature wiring insulation in older high intensity discharge light fixtures (assumed asbestos-containing in the 1960 era).
44. High temperature wiring insulation in older science room benchtop heating plates (assumed asbestos-containing in the 1960 era).
45. Various patterns of exterior wall texturing materials of entire school (confirmed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).
46. Tarry dampproofing on foundation walls (assumed asbestos-containing throughout all eras).
47. Remnant roofing materials (assumed asbestos-containing throughout all eras).
48. Roof patching tar (confirmed asbestos-containing in the 1973 era, assumed asbestos-containing throughout all other eras).
49. Remnant black tarry coating on original concrete roof deck and sidewalls (confirmed asbestos-containing in the 1972 era).
50. Welding aprons and gloves (confirmed asbestos-containing in the 1972 era, presumed to have been removed).
51. Kiln materials (confirmed trace of asbestos, presumed to have been removed).

The following materials have been found to be asbestos-free in this or previous surveys.

- “Marlite” mastics.
- All 2' x 2' Ceiling tiles.
- All 2' x 4' Ceiling tiles.
- All 12" x 12" Ceiling Tiles.
- “Hard fitting” insulation in Benson Building.
- Black lab tables and sinks in science classrooms of the Benson Building.

The effects of the following asbestos-containing materials on the proposed renovation are discussed below.

Vinyl Asbestos Tile and Associated Black and Tan Mastics

Various colors and patterns of 9" x 9" and 12" x 12" vinyl asbestos tiles have been found in the 1960, 1972, and 1973 eras of the school. The black flooring mastics associated with these tiles have also been found to contain asbestos, and in the 1960 era a tan-colored mastic also contained asbestos. No floor tiles of any type have been found in 1974 era. This vinyl asbestos tile and associated asbestos-containing mastics are concealed under newer replacement finishes in some areas and are assumed to have contaminated those replacement flooring finishes and their related mastics and leveling compounds. The vinyl asbestos tile and associated flooring mastics are assumed to be in good condition and not friable and will be partially removed by this project.

Sheet Vinyl and Contaminated Mastics

An asbestos-containing sheet vinyl was previously found in the 1960 era and described as a yellow 1/4" chip pattern. This material was completely removed during Phase 3 of the early 2000's renovations but may be present in other locations. Other patterns and colors of sheet vinyl are assumed to be asbestos-containing in the 1960, 1972, 1973, and 1974 eras. The mastics associated with these sheet vinyls are assumed to be contaminated by the asbestos-containing paper-like backing of the sheet vinyl. The sheet vinyl is assumed to be in good condition and not friable, and no sheet vinyl is anticipated to be disturbed by this project.

Carpet Mastics

Various colors of asbestos-containing carpet mastics have previously been identified in the 1960 (tan, black), 1973 (tan), and 1974 (yellow/brown, tan) eras of the school. No asbestos has been detected in the 1972 era carpet mastics. The carpet mastic is assumed to be in good condition and not friable and is unlikely to be removed by this project.

Black Rubber Stair Treads, Risers, and Stringers

An asbestos-containing black rubber stair tread and associated rubber risers and stringers were previously identified in the 1972 era of the school which were removed by a previous project but may be present at other locations. These materials were in poor to fair condition prior to being removed, and if present in other areas of the school these materials are assumed to be in similar condition but not friable despite the condition. The black rubber stair stringers in the 1973 era were also found to contain asbestos by the April 2021 survey but were in good condition and not friable. The black rubber stair treads, risers, and stringers are not anticipated to be disturbed by this project.

Dark Brown Rubber Flooring and Associated Dark Tan Mastic

An asbestos-containing dark brown rubber flooring material was previously found to contain asbestos in the 1960 era. The previous sample descriptions did not typically provide a pattern, such as "raised dot" or "tactile warning", but one sample described the rubber flooring as a 9" x 9" tile. The as-built drawings from the 1960's era describe it on stair nosing as "Johnsonite or equal", and a 1983 renovation drawing describes a "synthetic floor surface". The dark tan mastic associated with the rubber flooring was also found to contain asbestos. These materials were reportedly removed by a previous project but may be present in other areas of the school. If present, the rubber flooring and associated mastics are assumed to be in good condition and not friable and are not anticipated to require disturbance by this project.

Joint Compound of Gypsum Board Systems

Gypsum board systems (walls, ceilings, soffits, etc.) with asbestos-containing joint compound are present throughout the 1960, 1972, 1973, and 1974 eras. The joint compound is typically in good condition with isolated areas of damage. Joint compound is not typically considered friable but may become friable if damaged. Gypsum board systems with asbestos-containing joint compound will be partially removed by this project.

Plaster

Asbestos-containing plaster was previously identified in the 1960 era. The plaster was found in upper level rooms which were completely removed during Phase 3 of the early 2000's renovations. No asbestos-containing plaster has been identified outside of these areas, but unless the plaster has been specifically sampled, it should be assumed to contain asbestos. If present, the plaster is assumed to be in good condition and not friable. No plaster materials are anticipated to require disturbance by this project.

White and Grey "Sacking" Materials on Concrete

White and grey colored asbestos-containing concrete smoothing compounds, or "sacking", have previously been identified in the 1972 and 1973 eras of the school. The "sacking" is believed to have been used on concrete structures that required a smooth finish for aesthetic reasons (i.e. not in the mechanical or fan rooms), but because the material is typically covered by paint the actual extent of the material is unknown. The smoothing compounds had isolated areas of damage noted in the Benson Building but is not friable. The "sacking" materials are anticipated to require minor disturbance by this project.

Cement Asbestos Board Finish Materials

Cement asbestos board finish products have been identified in the school as a wainscot material and on column enclosures in the 1960, 1972, 1973, and 1974 eras. The cement asbestos board is generally in good condition with isolated areas of damage but is not friable. Cement asbestos board finish products are unlikely to be removed by this project.

Cement Asbestos Board Insulated Sandwich Infill Panels at Exterior Windows

Cement asbestos board insulated sandwich infill panels are present at some exterior windows in the 1960, 1972, 1973, 1974, and 1992 eras. The cement asbestos board insulated sandwich infill panels in the 1992 era appear to have been relocated from the 1972 era during construction of the lower elevator lobby in the Sports Complex. The cement asbestos board insulated sandwich infill panels are generally in good condition with isolated areas of damage and will be partially removed by this project.

Cement Asbestos Board Infill Panels at Interior Windows and Doors

Cement asbestos board infill panels are assumed to be present at a limited number of interior windows and doors in the 1960, 1972, 1973, and 1974 eras. If present, the cement asbestos board infill panels at interior windows and doors are assumed to be in good condition and not friable. No cement asbestos board infill panels at interior windows and doors are anticipated to be disturbed by this project.

Cement Asbestos Board on “Roof Break”

The 1974 drawings show cement asbestos board at the “roof break” on the roof of the East Benson Walkway. The 1998 Roof Replacement drawings do not detail this feature and the material is assumed to have been covered by the new roofing materials. The cement asbestos board is assumed to be in good condition and not friable and is unlikely to be disturbed by this project.

Mastics for Cement Asbestos Products

A grey asbestos-containing mastic was previously identified in the 1972 era between a cement asbestos board finish product and the underlying gypsum board substrate. Other colors of asbestos-containing mastics used to secure cement asbestos board finish products to various underlying substrates are assumed to be present throughout the 1960, 1972, 1973, and 1974 eras. Where used, these mastics are also assumed to have been contaminated by the cement asbestos board finish products. The mastics are assumed to be in good condition and not friable and is unlikely to be removed by this project.

Brown Mastic on Rubber Cove Bases and Stair Stringers

An asbestos-containing brown mastic has previously been identified on rubber cove bases and stair stringers in the 1960 era. No asbestos has been detected in cove base or stair stringer mastics of other eras. The asbestos-containing brown mastic is assumed to be in good condition and not friable and is unlikely to be disturbed by this project.

Ceiling Grid “L” Channel Mastic

Various colors, including yellow, grey, tan, and grey-green mastics, have previously been identified on ceiling grid “L” channels in the 1960, 1972, and 1974 eras. No ceiling grid “L” channel mastics have been observed in the 1973 era to date. The asbestos-containing “L” channel mastics are found on 2' x 2' and 2' x 4' suspended ceiling systems, as well as on the 12" x 12" concealed grid ceiling systems in these eras. The mastics are assumed to be in good condition and not friable and will require partial removal by this project.

Mastics for Chalk Board, Marker Boards, Tack Boards, Bulletin Boards and Mirrors

Previous surveys have identified asbestos-containing brown and black mastics on chalk boards, marker boards, tack boards, and bulletin boards in the 1960 era. Asbestos-containing mastics are assumed to have been used on similar components in the 1972, 1973, and 1974 eras, however, none of these types of mastics were observed in the 1973 project areas. Similar asbestos-containing mastics are assumed to have been used at mirrors throughout all of these eras. The mastics are assumed to be in good condition and not friable and are unlikely to be disturbed by this project.

Red Mastic for Sound Foam in the “TV Lab”

A previous survey identified an asbestos-containing red mastic used on the sound foam in the “TV Lab” on the second floor of the Benson Building (1973 era). The mastic is assumed to be in good condition and not friable and is unlikely to be removed by this project.

Black Tarry Dampproofing On Interior Face of Exterior Walls

An asbestos-containing black tarry dampproofing material was found on the interior face of exterior walls in the 1974 era. A similar material is assumed to have been used in the 1960, 1972, and 1973 eras which is assumed to be asbestos-containing, however, none was observed within the current project areas. Note, this does not include the black mastics/tarry coating used in the 1960 era utility tunnels which has previously been shown to be asbestos-free. The black tarry dampproofing material was in good condition and not friable and is unlikely to be disturbed by this project.

Mastics Used to Secure Styrofoam and Other Types of Insulation to Exterior Concrete Walls

An asbestos-containing green mastic was identified in the 1972 era between Styrofoam insulation and an exterior concrete wall. A brown/tan mastic was identified in the 1973 era also between Styrofoam insulation and an exterior concrete wall. Various other colors of mastics have been identified and found to not contain asbestos. Because the mastics are concealed, the extent of each type of mastic is unknown and all Styrofoam panels should be assumed to have asbestos-containing mastics where attached to an exterior concrete wall. Similar mastics are assumed to have been used in the 1960, 1972, 1973, and 1974 eras to secure Styrofoam or other types of insulation to exterior concrete walls, and those mastics are assumed to be asbestos-containing. These mastics are assumed to be in good condition and not friable and will require partial removal by this project.

Remnants of Asbestos-containing Fireproofing

Spray-on fireproofing exists on structural steel and on metal roof decks in the two fan rooms at either end of the second floor on the Benson Building (1973 era). The original fireproofing in those rooms was asbestos-containing but was removed and replaced with the current non-asbestos material in the early 1980's. The removal of the old fireproofing was not complete and residual asbestos-containing fireproofing and overspray still exists in areas that were inaccessible at the time of removal, including on roof decking; structural, architectural, mechanical, and electrical items and equipment as well as in “nooks and crannies” where the structural members meet. Significant quantities of asbestos-containing fireproofing overspray are anticipated behind the gypsum wall board at the exterior wall and within the wall cavity of the other perimeter walls. Old asbestos-containing fireproofing overspray is assumed to exist under all insulated piping, on mechanical and electrical components running through concealed areas and on concealed interior wall cavities at the perimeter of the fan rooms.

Any fireproofing encountered in those areas that is different from the existing gray fireproofing (typically white colored with flakes of mica) is assumed to be asbestos-containing. In areas where non-asbestos containing fireproofing is to be completely removed to install new walls, new structural, electrical, mechanical or architectural components, the newer fireproofing shall be assumed to be over residual amounts of asbestos-containing fireproofing as a precaution and removed as asbestos-contaminated. Non-asbestos fireproofing may remain in place where only incidental disturbance (such as installation of hanger rods) takes place. Previous air monitoring tests have shown that workers installing equipment or component hangers through the non-asbestos fireproofing without removing it were not exposed above the OSHA permissible exposure limits for asbestos.

Miscellaneous disturbance or removal of accessible architectural, electrical, mechanical, or structural systems coated with non-asbestos fireproofing such as removal of suspended ceiling components, system hangers, conduit, non-insulated piping, and other systems is not considered asbestos removal work unless otherwise identified in the contract documents. The contractor shall coordinate all demolition with other trades to determine if they require or desire trained asbestos workers to perform their demolition and include that demolition in the contract bid. The contractor and all sub-contractors shall review the Hazardous

Materials Assessment to fully understand what materials contain asbestos or other hazardous materials, where they are located and the impact that they may have on project costs.

“Hard Fitting” Insulation on Pipe Fittings

Asbestos-containing “hard fitting” insulation has previously been identified on various piping systems in the 1960 and 1972 eras, including heating, domestic hot and cold water piping, and roof drain piping that have fiberglass insulation on piping runs. Asbestos-containing “hard fitting” pipe insulation is assumed to be present in the 1974 era. No asbestos-containing “hard fitting” pipe insulation has been found in the 1973 era. The condition of the “hard fitting” insulation is assumed to vary from good to poor and is friable. The “hard fitting” insulation will be partially removed by this project.

“MAG” Insulation on Mechanical Components

Asbestos-containing “MAG” insulation has previously been identified on boiler stacks and hot water storage tanks in the 1960 era. The “MAG” insulation was previously removed from these components, and no other “MAG” insulation on equipment is known to exist at the school. No “MAG” insulation is anticipated to be disturbed by this project.

Insulation on Abandoned Heating and Plumbing Piping Under 1960 Era Slab

The insulation on heating and plumbing piping abandoned below the concrete slab of the 1960 era is assumed to be asbestos-containing. The condition of the insulation is assumed to vary from good to poor and is friable. No insulation on the abandoned piping is anticipated to be disturbed by this project.

Duct Pin Mastic on Insulated Outside Air Intakes

Previous surveys have identified a greyish asbestos-containing duct pin mastic on insulated outside air intakes in the 1960 era. An asbestos-containing brown duct pin mastic was also previously identified on the metal plenum walls of insulated outside air intakes in the 1973 era. Asbestos-containing duct pin mastics of various colors are assumed to be present on similar mechanical components in the 1972 and 1974 eras. The duct pin mastics are assumed to be in good condition and not friable and are not anticipated to be disturbed by this project.

Duct Pin Mastic on Ductwork Sound Linings

A previous survey identified an asbestos-containing duct pin mastic used to secure sound linings to the inside of ductwork in the 1960 era. Similar mastics of various colors are assumed to have been used on similar mechanical components in the 1972, 1973, and 1974 eras. The duct pin mastics are assumed to be in good condition and not friable and are not anticipated to be disturbed by this project.

Duct Seam Sealants

Asbestos-containing dark red duct seam sealant have previously been identified on ductwork in the 1972 era. Duct seam sealants of various colors in the 1960 era are assumed to be asbestos-containing. No duct seam sealants were observed in the 1974 era, and all duct seam sealants sampled to date in the 1973 era have not contained asbestos. The duct seam sealants are assumed to be in good condition and not friable and may require minor disturbance by this project.

Black Tarry Coating on Outside Air Ductwork

The black coating on outside air ductwork in the 1960 era has previously been found to contain asbestos. The tarry coating is assumed to be in good condition and is not friable and is not anticipated to require disturbance by this project.

Sealants on Air Handling Units

Various colors of sealants used on air handling units are assumed to contain asbestos in the 1960 and 1972 eras. No air handling unit sealants were observed in the 1974 era, and all air handling unit sealants sampled to date in the 1973 era have not contained asbestos. The sealants are assumed to be in good condition and not friable and are not anticipated to require disturbance by this project.

Paper-Like Lining of Abandoned Under-Slab Fiberglass Ductwork

The paper-like lining of the abandoned under-slab fiberglass ductwork in the 1973 era contains asbestos. The paper-like lining is assumed to be in good condition but friable and is not anticipated to require disturbance by this project.

Flange Gaskets and Valve Packings

Asbestos-containing flange gaskets have previously been identified in the 1972 era. Asbestos-containing flange gaskets and valve packings are assumed to be present throughout all other eras of construction, including newer construction. The flange gaskets and valve packings are assumed to be in good condition and not friable and are anticipated to require partial removal by this project.

Black Chemical Resistant Laboratory Countertops, Sinks, and Backsplashes

Black chemical resistant laboratory countertops, sinks, and backsplashes were previously noted in the 1960 era science classrooms, and these components are assumed to contain asbestos. These components are assumed to be in good condition and not friable and are not anticipated to require disturbance by this project. Note that similar lab tables, etc. in the 1973 era Benson Building have been sampled and found to not contain asbestos.

White Insulating Cores of Unlabeled Wood Doors

The white insulating materials of unlabeled wood doors throughout the 1960 era have previously been identified to contain asbestos. No asbestos-containing insulation or other suspect insulation has been identified in other eras. The white insulating materials are assumed to be in good condition and not friable unless the door is damaged. No wood doors with asbestos-containing insulating cores are anticipated to be disturbed by this project.

Black Tarry Sound Lining Inside of Clock/Speaker Box Housings

The black tarry lining of clock/speaker housings have previously been found to contain asbestos in the 1960, 1972, 1973, and 1974 eras. The tarry lining is assumed to be in good condition and not friable and are unlikely to be disturbed by this project.

Undercoating on the Bottom of Stainless Steel Drinking Fountains

Previous surveys have identified an asbestos-containing pink undercoating on the bottom of stainless steel drinking fountains in the 1972 and 1973 eras. Asbestos-containing undercoatings of various colors are assumed to be present on other drinking fountains in the 1960, 1972, 1973, and 1974 eras. The undercoating materials are assumed to be in good condition and not friable and are not anticipated to require disturbance by this project.

Undercoating on the Bottom of Stainless Steel Sinks

Previous surveys have identified an asbestos-containing black undercoating on the bottom of stainless steel sinks in the 1960 and 1972 eras. Asbestos-containing undercoatings of various colors are assumed to be present on other sinks in the 1960, 1972, 1973, and 1974 eras. The undercoating materials are assumed to be in good condition and not friable and are not anticipated to require disturbance by this project.

White Sealants at Exterior Doors

A white asbestos-containing sealant was previously identified on an exterior door in the 1960 era. The sealant was in good condition and was not friable and will be partially removed by this project.

Grey Sealants on Interior Door Frames

A previous survey identified a grey sealant on an interior door frame that contained a trace amount of asbestos. The sealant is assumed to contain greater than 1% asbestos if analyzed by TEM NOB, and therefore would be considered an asbestos-containing material. The grey sealant on interior 1960's era door frames are assumed to be in good condition and not friable and are not anticipated to require disturbance by this project.

Black Tarry Sound Lining Inside of Hollow Metal Door Frames

An asbestos-containing black tarry sound lining was previously identified on the hollow metal door frames in the 1972 era. This material is assumed to be in good condition and not friable and is not anticipated to require disturbance by this project.

Exterior Window Sealants, Caulking, and Glazing Compounds

A previous survey identified an asbestos-containing black caulking on the 1972 era exterior windows. A dark brown asbestos-containing exterior window sealant was also previously identified in the 1974 era. A dark brown "patch" sealant was identified in the 1974 era during the October 2020 inspections. Other asbestos-containing sealants, caulking, and glazing compounds are assumed to be present on windows and related components throughout the 1960 era. No asbestos was found in these types of materials in the 1974 era to date. These materials are assumed to be in good condition and not friable and will require partial removal by this project.

Penetration Putties

A previous survey identified a white asbestos-containing penetration putty in the 1972 era. Various other colors of penetration putties are assumed to be present throughout the 1960, 1972, 1973, and 1974 eras, and those putties are assumed to be asbestos-containing. The penetration putties are assumed to be in good condition and not friable and are not anticipated to require disturbance by this project.

High temperature Wiring Insulation Inside of Older Fluorescent Light Fixtures

A previous survey identified an asbestos-containing high temperature wiring insulation inside of older fluorescent light fixtures in the 1960 era. The insulation was found at the "pigtail" connection to the light fixture but was not observed running between fixtures. The high temperature wiring insulation was in fair condition but not friable. The high temperature wiring insulation in older fluorescent light fixtures will be partially removed by this project.

High temperature Wiring Insulation and Heat Shield Inside of Older Incandescent Light Fixtures

Older incandescent light fixtures in the 1960 era are assumed to have asbestos-containing high temperature wiring insulation and heat shields. The high temperature wiring insulation and heat shields are assumed to be in good condition, and the wiring insulation is not friable, but the heat shields are. The high temperature wiring insulation and heat shields in older fluorescent light fixtures are not anticipated to require disturbance by this project.

High temperature Wiring Insulation Inside of Older High Intensity Discharge Light Fixtures

High intensity discharge light fixtures are assumed to have asbestos-containing high temperature wiring insulation in the 1960 era. The insulation is assumed to be present at the "pigtail" connection to the light fixture. The high temperature wiring insulation is assumed to be in good condition and not friable. The high temperature wiring insulation in older high intensity discharge light fixtures is not anticipated to require disturbance by this project.

High temperature Wiring Insulation Inside of Older Science Room Benchtop Heating Plates

The benchtop heating plates in the older 1960's era science rooms are assumed to have an asbestos-containing high temperature wiring insulation. The high temperature wiring insulation was in fair condition but not friable. The high temperature wiring insulation in older science room benchtop heating plates is not anticipated to require disturbance by this project.

Various Patterns of Exterior Wall Texturing Materials

Two types of asbestos-containing exterior wall texturing materials are present around the exterior of the 1960, 1972, 1973, and 1974 eras. The "main" type of asbestos-containing wall texture is a cementitious heavily textured paint material. The second type of asbestos-containing wall texture is found on "waffle panels" of the original 1960 exterior. Limited amounts of both types of wall texturing materials are now located interior to the building in isolated areas due to subsequent renovations and additions. The condition of the "main" wall texturing material varied from good to poor and is friable. The heavily textured paint material has been covered with a newer, asbestos-free EIFS "stucco" finish system in areas renovated by

the 2000's multi-phase projects. The wall texturing material found on the "waffle panels" was typically in good condition but friable. The "main" wall texturing material will require partial removal by this project. The wall texturing materials of the "waffle panels" of a "storefront" section of exterior windows will be removed by this project.

Tarry Dampproofing on Foundation Walls

Exterior foundation walls are assumed to have an asbestos-containing tarry dampproofing materials in the 1960, 1972, 1973, and 1974 era, including at the inside of the exterior walls of the utilidors in the 1960's era. The tarry dampproofing is assumed to be in good condition and not friable and is not anticipated to be disturbed by this project.

Remnant Roofing Materials

Remnant asbestos-containing roofing materials are assumed to be present under newer roofing throughout all eras of the school. These materials are anticipated to include components such as debris from former built-up roof membranes, various roof mastics and sealants, putties, and vapor retarder materials. In addition, built-up roofing debris has previously been noted in scattered locations throughout the school, typically on top of ceiling tiles and on other components in the ceiling spaces and is anticipated to be found in other inaccessible areas. The remnant roofing materials are expected to be in conditions ranging from good to poor but not friable. Remnant roofing materials are anticipated to require partial removal by this project.

Roof Patching Tar

A previous survey identified a grey asbestos-containing roof "patching" tar on the 1973 era roofs. Various other colors of roof "patching" tars are assumed to be present throughout all other eras, including those of newer construction, and are assumed to be asbestos-containing. The roof "patching" tars are assumed to be in good condition and not friable and will be partially removed by this project.

Remnant Black Tarry Coating on Original Concrete Roof Deck and Sidewalls

An asbestos-containing black tarry coating was found scattered throughout the concrete roof deck and sidewalls of the 1972 era Sports Complex. A similar material is assumed to have been used on other portions of the 1972 era, and other similar materials may have been used in other eras. The tarry coating was in good condition and not friable and is anticipated to require minor disturbance by this project.

Welding Aprons and Gloves

A previous survey identified asbestos-containing welding aprons and gloves. These materials are presumed to have since been removed from the school.

Kiln Materials

Sampling performed during inspections in 1983 described a "brown sandy material" in a kiln that contained a trace of chrysotile asbestos. This kiln is presumed to have been removed from the school.

2. Dust Sampling for Asbestos

The following TABLE 2A lists the dust samples for asbestos taken in November 2009 in the Gym Building, and the results of the laboratory analysis using ASTM D5756. Dust sample field survey data sheets and laboratory reports are included as Appendix B. Refer to Appendix F for sample locations.

TABLE 2A

SAMPLE NUMBER	DESCRIPTION	LOCATION	RESULTS ASBESTOS St./cm² *	RESULTS PERCENTAGE ASBESTOS
EHG1109-AD1	Dust on metal, 10cm x 10 cm	Upper, North Mech Rm, 301, Bottom inside Return Air duct at East wall, 4-12:37	37,000 st/cm ² Chrysotile	0.0000493%

HAZARDOUS MATERIALS ASSESSMENT

Division 2
Section 02 26 00

SAMPLE NUMBER	DESCRIPTION	LOCATION	RESULTS ASBESTOS St./cm² *	RESULTS PERCENTAGE ASBESTOS
EHG1109-AD2	Dust on metal, 10cm x 10 cm	Upper, North Mech Rm, 301, Bottom inside of Outside Air Duct plenum, at North wall, 4-13:50	5,280 st/cm2 Actinolite, Tremolite, Chrysotile	0.000591%

* The St./cm² results by ASTM D5755 and D5756 are not directly comparable due to differences in sample preparation. The D5756 results are primarily meant to determine the weight percentage. Refer to discussion in Part E below.

The following TABLE 2B lists the dust samples for asbestos taken in November 2005 in various areas of the school, and the results of the laboratory analysis using ASTM D5756. Dust sample field survey data sheets and laboratory reports are included as Appendix B. Refer to Appendix F for sample locations.

TABLE 2B

SAMPLE NUMBER	DESCRIPTION	LOCATION	RESULTS ASBESTOS St./cm² *	RESULTS PERCENTAGE ASBESTOS
EB1105-D1	Dust, 10 cm x 10 cm, on metal	Classroom 105, above ceiling on duct, 19-15:27	140,000.0 Chrysotile	0.0014%
EB1105-D2	Dust, 10 cm x 10 cm, on metal	Storage 100, on top of light, no ceiling in room, 19-15:49	1,000,000.0 Chrysotile	0.022%
EB1105-D3	Dust, 10 cm x 10 cm, on metal	F14 Fan Rm, SE Corner, inside AHU-1, at coil separation lip, 19-16:43	65,000.0 Chrysotile and Actinolite	0.000011%
EB1105-D4	Dust, 10 cm x 10 cm, on metal	Classroom 202, on top of light in ceiling space, 19-17:04	720,000.0 Chrysotile	0.014%
EB1105-D5	Dust, 10 cm x 10 cm, on metal	SWS3, upper SW Street, at N end on light, greasy?, 19-17:46	310,000.0 Chrysotile	0.0022%

* The St./cm² results by ASTM D5755 and D5756 are not directly comparable due to differences in sample preparation. The D5756 results are primarily meant to determine the weight percentage. Refer to discussion in Part E below.

The following TABLE 2C lists the asbestos dust samples taken in February 2004 in the original section of the school, and the results of the laboratory analysis. Asbestos dust field survey data sheets and laboratory reports are included as Appendix B. Refer to Appendix F for sample locations.

TABLE 2C

SAMPLE NUMBER	DESCRIPTION	LOCATION	Results Asbestos St./cm² *	Results percentage Asbestos
EB204-D1	Dust on metal, 10cm x 10cm	On top of diffuser in Band Office, Rm 84B, 16-12:12	167,000 st/cm2 Chrysotile	0.0033%
EB204-D2	Dust on metal, 10cm x 10cm	Inside discharge of Return fan duct, upper Rm 91a, 16-12:39	194,000 st/cm2 Chrysotile	0.0020%
EB204-D3	Dust on metal, 10cm x 10cm	On top of duct above Rm 86a, 16-13:31	481,000 st/cm2 Chrysotile, Actinolite	0.000092%
EB204-D4	Dust on metal, 10cm x 10cm	On top of duct above Rm 85b, 16-15:09	518,000 st/cm2 Chrysotile	0.0031%
EB204-D5	Dust on metal, 10cm x 10cm	On lower flange of Joist in Rm 1, 16-15:40	12,300 st/cm2 Chrysotile	0.0000051%

HAZARDOUS MATERIALS ASSESSMENT

Division 2
Section 02 26 00

SAMPLE NUMBER	DESCRIPTION	LOCATION	Results Asbestos St./cm² *	Results percentage Asbestos
EB204-D6	Dust on ceiling tile, 10cm x 10cm	On concealed grid ceiling tile Rm 5, by west wall, 16-15:56	176,000 st/cm ² Chrysotile	0.0019%

* The St./cm² results by ASTM D5755 and D5756 are not directly comparable due to differences in sample preparation. The D5756 results are primarily meant to determine the weight percentage. Refer to discussion in Part E below.

The following TABLE 2D lists the dust samples for asbestos taken January 2002 in the original section of the school, and the results of the laboratory analysis using ASTM D5755. Dust sample field survey data sheets and laboratory reports are included as Appendix B. Refer to Appendix F for sample locations.

TABLE 2D

SAMPLE NO.	BUILDING AREA / LOCATION	RESULTS ASBESTOS St./cm² *
EB102-AD1	Dust on metal, 10cm x 10cm On top of elec panel LG in Fan Rm. 4	83,300.0 Chrysotile, Amosite, Tremolite
EB102-AD2	Dust on metal, 10cm x 10cm Top of supply duct off Fan 33 in Fan Rm. 4	37,000.0 Chrysotile
EB102-AD3	Dust on metal, 10cm x 10cm Top of speaker box in Class Rm. 3	7,400.0 Chrysotile
EB102-AD4	Dust on metal, 10cm x 10cm Top of ceiling tile outside Janitor 173	27,800.0 Chrysotile
EB102-AD5	Field Blank Ran 10 min w/typical sampling train	NA

("QC" refers to the laboratory's internal quality control re-analysis.)

* The St./cm² results by ASTM D5755 and D5756 are not directly comparable due to differences in sample preparation. The D5756 results are primarily meant to determine the weight percentage. Refer to discussion in Part E below.

The following TABLE 2E lists the dust samples for asbestos taken in January 2003 in selected areas of the school, and the results of the laboratory analysis using ASTM D5756. Dust sample field survey data sheets and laboratory reports are included as Appendix B. Refer to Appendix F for sample locations.

TABLE 2E

SAMPLE NUMBER	DESCRIPTION	LOCATION	RESULTS ASBESTOS St./cm² *	RESULTS PERCENTAGE ASBESTOS
EB103-D1	Dust on metal, 10cm x 10cm	Classroom 75 inside Supply Air duct at heat coil access	2,130,000.0 Chrysotile and Amosite	0.017%
EB103-D1 Lab Dupe	Dust on metal, 10cm x 10cm	Classroom 75 inside Supply Air duct at heat coil access	1,900,000.0 Chrysotile	0.00023%
EB103-D2	Dust on metal, 10cm x 10cm	Classroom 77 on top of duct at SE	685,000.0 Chrysotile	0.015%
EB103-D3	Dust on metal, 10cm x 10cm	Classroom 110 inside Supply Air duct at turning vane access panel	1,370,000.0 Chrysotile and Amosite	0.0013%
EB103-D4	Dust on metal, 10cm x 10cm	Classroom 111 on top of light at center	345,000.0 Chrysotile	0.0090%
EB103-D5	Dust on metal, 10cm x 10cm	Copy Room in Administration Area, on top of 18" diameter duct.	24,100.0 Chrysotile and Amosite	0.000046%
EB103-D6	Dust on metal, 10cm x 10cm	Inside mixing box of AHU #19 for Administration Area	481,000.0 Chrysotile	0.00065%

HAZARDOUS MATERIALS ASSESSMENT

Division 2

Section 02 26 00

SAMPLE NUMBER	DESCRIPTION	LOCATION	RESULTS ASBESTOS St./cm² *	RESULTS PERCENTAGE ASBESTOS
EB103-D7	Dust on metal, 10cm x 10cm	At intake to supply fan to Auditorium, upper fan room	1,760,000.0 Chrysotile and Amosite	0.00012%
EB103-D8	Dust on fabric, 10cm x 10cm	On fiberglass sound lining inside return air from Auditorium	555,000.0 Chrysotile	0.010%
EB103-D9	Dust on metal, 10cm x 10cm	"New" library on top of Diffuser	1,380,000.0 Chrysotile	0.0059%
EB103-D10	Dust on metal, 10cm x 10cm	On return air damper in mixing box in AHU #29 serving Library	296,000.0 Chrysotile and Amosite	0.000074%
EB103-D11	Dust on metal, 10cm x 10cm	Inside return air duct at E wall Counseling.	204,000.0 Chrysotile and Amosite	0.00074%
EB103-D12	Dust on metal, 10cm x 10cm	On top of supply air duct in Teacher's Lounge	407,000.0 Chrysotile	0.0038%
EB103-D13	Field Blank	Ran 10 min w/typical sampling train	NA	NA

* The St./cm² results by ASTM D5755 and D5756 are not directly comparable due to differences in sample preparation. The D5756 results are primarily meant to determine the weight percentage. Refer to discussion in Part E below.

3. Lead-Containing Materials

Lead-Testing

EHS-Alaska tested paint and other materials throughout the affected areas of the building using a Heuresis XRF lead paint analyzer. Previous lead testing in the building used a NITON XRF lead paint analyzer. Lead in paints tested varied from a trace amount to 8.6 mg/cm². Lead in other materials tested varied from a trace amount to 19.01 mg/cm². Refer to the Lead Analyzer Test Results Table in Appendix D that identifies the surfaces tested, and the results. The Lead Test Locations are shown in the Drawings in Appendix F.

Paints

There were varying lead contents found in the paints, based on what surfaces they are on, with most surfaces containing little lead (but are still classified as lead-containing materials by OSHA). The highest levels of lead were found on exterior paints throughout the school, with lower levels on walls and other painted surfaces, and lowest levels on pre-finished materials.

Lead based paints (paint containing more than 1.0 mg/cm² of lead) were identified at the building on various types of exterior textured and untextured paints, paint on older exterior wooden door frames, older interior metal door frames, older vinyl covered gypsum board walls, and it is anticipated that other components which are hidden, concealed, or otherwise not tested may be painted with lead-based paint. Lead was detected at very low levels in most of the painted floor, wall and ceiling surfaces. XRF testing is not able to "prove" that "no" lead exists in the paint. Low levels of lead found by XRF testing does not mean that the paints are free of lead, the paints may contain lead. At least an initial exposure determination of potential worker exposures for all disturbance of lead-containing materials is required unless laboratory analysis shows that there is zero detectable lead in the materials being disturbed (which requires special analysis). However, these paints may not present a hazard to occupants or workers performing renovation or demolition if lead-safe work practices are followed.

Ceramic Wall Tile and Glazing

Relatively high concentrations of lead were found in the glazing of ceramic wall tiles. The concentrations of lead in ceramic glazing compounds should not be compared to lead-based paint criteria, as the glazing is inherently less likely to cause lead to be present in dusts or on surfaces, where it can be ingested. Lead in ceramic tile glazing may not pose a hazard to occupants, or workers performing renovation or demolition if lead-safe work practices are followed. All ceramic tiles and fixtures in the facility should be assumed to contain lead.

Plastic Components

Relatively low concentrations of lead were found in plastic components, such as plastic toilet partitions, but it is anticipated that higher levels of lead may be found in "Formica" laminate panels, vinyl building components, or other miscellaneous plastic building components. The concentrations of lead in plastic compounds should not be compared to lead-based paint criteria. Lead in plastic compounds may have surface deterioration and if not cleaned regularly, lead may be present in dusts or on surfaces, where it can be ingested. Lead in plastic compounds may not pose a hazard to occupants, or workers performing renovation or demolition if good work practices are followed.

Metallic Lead in Batteries and Pipe Solder

Metallic lead items identified in the building included lead solder at copper piping, poured lead sealants at bell and spigot joints of waste and vent piping, and lead acid batteries in emergency lights and other battery backup equipment. If removed during renovation or demolition they should be recycled or disposed of as hazardous waste.

Settled and Concealed Dust

Lead dust wipes were previously collected throughout the facility in areas of heavy dust. Lead content varied from <91.0 µg/ft² to 9,000.0 µg/ft². This level is typical for concealed dusts in areas that are not routinely cleaned in most buildings of this age and may not present a hazard to workers if proper work practices and engineering controls are used.

Lead Dusts

Portions of the dusts in the building were sampled for lead content. The following TABLE 3A lists the lead dust samples taken in November 2009 in Mechanical Room 301 and the results of the laboratory analysis. Lead Dust field survey data sheets and laboratory reports are included as Appendix C. Refer to Appendix F for sample locations.

TABLE 3A

<i>SAMPLE NUMBER</i>	<i>DESCRIPTION</i>	<i>LOCATION</i>	<i>RESULTS LEAD/SF µg/ft²</i>
EHG1109-AD1	Dust on metal, 10cm x 10cm	Upper, North Mechanical Room 301, bottom inside return air duct at east wall, 4-12:37	990.0
EHG1109-AD2	Dust on metal, 10cm x 10cm	Upper, North Mechanical Room 301, bottom inside of outside air duct plenum at north wall, 4-13:50	380.0
EHG1109-AD3	Field blank	Wiped on hands, template, etc., but no other surfaces	<10.0

The following TABLE 3B lists the lead dust samples taken in November 2005 in the Benson Building and the results of the laboratory analysis. Lead Dust field survey data sheets and laboratory reports are included as Appendix C. Refer to Appendix F for sample locations.

TABLE 3B

SAMPLE NUMBER	DESCRIPTION	LOCATION	RESULTS LEAD/SF $\mu\text{g}/\text{ft}^2$
EB1105-LD1	Dust, 10 cm x 10 cm, on metal	Classroom 105, above ceiling on duct, 19-15:27	2,900.0
EB1105-LD2	Dust, 10 cm x 10 cm, on metal	Storage 100, on top of light, no ceiling in room, 19-15:49	1,000.0
EB1105-LD3	Dust, 10 cm x 10 cm, on metal	F14 Fan Rm, SE Corner, inside AHU-1, at coil separation lip, 19-16:43	360.0
EB1105-LD4	Dust, 10 cm x 10 cm, on metal	Classroom 202, on top of light in ceiling space, 19-17:04	1,000.0
EB1105-LD5	Dust, 10 cm x 10 cm, on metal	SWS3, upper Southwest Street, at north end on light, greasy?, 19-17:46	9,000.0
EB1105-LD6	Field blank	Wiped on hands and template, no other surfaces touched	<10.0

The following TABLE 3C lists the lead dust samples taken in February 2004 in the Former Music Area, and the results of the laboratory analysis. Lead Dust field survey data sheets and laboratory reports are included as Appendix C. Refer to Appendix F for sample locations.

TABLE 3C

SAMPLE NUMBER	DESCRIPTION	LOCATION	RESULTS LEAD/SF $\mu\text{g}/\text{ft}^2$
EB204-LD1	Dust on metal, 10cm x 10cm	On top of diffuser in Band Office, Rm 84B, 16-12:12	1,200.0
EB204-LD2	Dust on metal, 10cm x 10cm	Inside discharge of Return fan duct, upper Rm 91a, 16-12:39	3,000.0
EB204-LD3	Dust on metal, 10cm x 10cm	On top of duct above Rm 86a, 16-13:31	3,600.0
EB204-LD4	Dust on metal, 10cm x 10cm	On top of duct above Rm 85b, 16-15:09	320.0
EB204-LD5	Dust on metal, 10cm x 10cm	On lower flange of Joist in Rm 1, 16-15:40	<91.0
EB204-LD6	Dust on ceiling tile, 10cm x 10cm	On concealed grid ceiling tile Rm 5, by west wall, 16-15:56	1,000.0
EB204-LD7	Field Blank	Wiped on hands and template	10.0

The following TABLE 3D lists the lead dust samples taken in January 2002, and the results of the laboratory analysis. Lead Dust field survey data sheets and laboratory reports are included as Appendix C. Refer to Appendix F for sample locations.

TABLE 3D

SAMPLE NUMBER	DESCRIPTION	LOCATION	RESULTS LEAD/SF $\mu\text{g}/\text{ft}^2$
EB102-LD1	Dust on metal, 10cm x 10cm	On top of elec panel LG in Fan Rm. 4	910.0
EB102-LD2	Dust on metal, 10cm x 10cm	Top of supply duct off Fan 33 in Fan Rm. 4	1,500.0

SAMPLE NUMBER	DESCRIPTION	LOCATION	RESULTS LEAD/SF $\mu\text{g}/\text{ft}^2$
EB102-LD3	Dust on metal, 10cm x 10cm	Top of speaker box in Class Rm. 3	230.0
EB102-LD4	Dust on metal, 10cm x 10cm	Top of ceiling tile outside Janitor 173	730.0
EB102-LD5	Field Blank	Wiped on gloves, typical handling	<10.0

The following TABLE 3E lists the lead dust samples taken in January 2003, and the results of the laboratory analysis. Lead Dust field survey data sheets and laboratory reports are included as Appendix C. Refer to Appendix F for sample locations.

TABLE 3E

SAMPLE NUMBER	DESCRIPTION	LOCATION	RESULTS LEAD/SF $\mu\text{g}/\text{ft}^2$
EB103-LD1	Dust on metal, 10cm x 10cm	Classroom 75 inside Supply Air duct at heat coil access	1,600.0
EB103-LD2	Dust on metal, 10cm x 10cm	Classroom 77 on top of duct at SE	1,700.0
EB103-LD3	Dust on metal, 10cm x 10cm	Classroom 110 inside Supply Air duct at turning vane access panel	820.0
EB103-LD4	Dust on metal, 10cm x 10cm	Classroom 111 on top of light at center	680.0
EB103-LD5	Dust on metal, 10cm x 10cm	Copy Room in Administration Area, on top of 18" diameter duct.	140.0
EB103-LD6	Dust on metal, 10cm x 10cm	Inside mixing box of AHU #19 for Administration Area	360.0
EB103-LD7	Dust on metal, 10cm x 10cm	At intake to supply fan to Auditorium, upper fan room	1,400.0
EB103-LD8	No sample LD8 taken, due to fiberglass substrate of D8	N/A	N/A
EB103-LD9	Dust on metal, 10cm x 10cm	"New" library on top of Diffuser	1,400.0
EB103-LD10	Dust on metal, 10cm x 10cm	On return air damper in mixing box in AHU #29 serving Library	1,900.0
EB103-LD11	Dust on metal, 10cm x 10cm	Inside return air duct at E wall Counseling.	140.0
EB103-LD12	Dust on metal, 10cm x 10cm	On top of supply air duct in Teacher's Lounge	1,700.0
EB103-LD13	Field Blank	Wiped on hands and template	<10.0

4. Suspect Fungal and Bacterial Growth

The following TABLE 4A lists the Bulk and Tape Lift sample which were analyzed for Suspect Fungal Growth and the results of the laboratory analysis. Fungal and Bacterial field survey data sheets and laboratory reports are included as Appendix E. Refer to Appendix F for sample locations.

Table 4A –Mold Sampling Results, August 2, 2023 by EHS-Alaska.

SAMPLE/TYPE	LOCATION	Misc. Spores Present	Mold Growth	Comments	General Impression
B01, Bulk	Inside Air Duct at AHU-2, NWL106	Variety	None	None	Normal Trappings
TL02, Tape Lift	Inside Outside Air Duct at AHU-2, NWL106	Very Few	None	None	Normal Trappings
TL03, Tape Lift	Base of GWB wall below Air Intake, NWL106	None	3+ Stachybotrys	None	Mold Growth
TL05, Tape Lift	NWL106, AHU-2 inside Mixing Chamber, formerly wet	Few	None	Few Chaetomium spores detected	Mold Growth in vicinity?
B06, Bulk	NWL106, Inside Supply at Sq to Round duct	Variety	None	None	Normal Trappings
B07, Bulk	Utiliduct at ROTC Storage, NWL107	Very Few	3+ Stachybotrys	None	Mold Growth

The results of the Bulk and Tape Lift mold sampling inside the ductwork and AHU-2 Mixing Chamber was characterized as normal trappings by the lab, which can be described as normal dusts and debris. The Bulk and Tape Lift mold samples at the water damaged gypsum wall board in the Lower Fan Room, NWL106, and in the small furred out wall location concealing the piping and utiliduct in the ROTC Storage Room NWL107, which is adjacent to the Lower Fan Room, NWL106 had visible suspect fungal growth, which was confirmed to consist mainly of Stachybotrys.

The following TABLE 4B lists the Non-Potable Water samples which were analyzed for Legionella Bacteria and the results of the laboratory analysis. Fungal and Bacterial field survey data sheets and laboratory reports are included as Appendix E. Refer to Appendix F for sample locations.

Table 4B –Legionella Sampling Results, August 2, 2023 by EHS-Alaska

Sample/Type	Location	Genome Units	Genome Units per Liter of water (GU/L)
S04, NP Water	Top of Supply Air Duct to AHU-2	1,900 GU	1,500,000,000 GU/L
S08, NP Water	Water Inside Utiliduct at ROTC Storage Room	510 GU	450,000,000 GU/L

The results of the sampling for Legionella bacteria on top of the Supply Air Duct indicates that amplification is occurring and there is a potential for Legionella-laden aerosolized water vapors to be conveyed through the HVAC system which may result in exposure to occupants. Legionella bacteria are found naturally in the environment and it is acceptable to have some low levels in building water sources. Because the water was on the top surface of the ductwork, but the inside of the ductwork was not noted to be wet at the time of the sampling, and the bulk mold samples inside the ductwork taken at formerly wet locations were not classified as having mold growth it would take a larger water infiltration event for water to infiltrate the ductwork, therefore the likelihood of bacteria actually being aerosolized is less likely, but possible.

The water inside of the Utiliduct in the ROTC Storage Room, NWL107, connecting the east and west portions of the school was concealed behind a newer furred wall, likely because of the long-term moisture problems which were evident where the Utiliduct entered the Lower Level of the west portion of the school (where the samples were taken).

5. PCB-Containing Materials

Light Ballasts

Older fluorescent lights typically have PCB-containing ballasts. PCB-containing ballasts in fluorescent lights were banned in 1978, but manufacturers were allowed to use up existing stocks, and lights may have been reused from other facilities. The survey included examination of what were considered to be representative light fixtures, but not all fixtures were able to be accessed. All lights shall be inspected during removal or relocation. Unless ballasts were marked "No PCBs," they must be assumed to contain PCBs and must be disposed of as a hazardous waste when removed for disposal. PCB-containing ballasts were found in the current project areas, and fluorescent light fixtures with PCB-containing ballasts are known to be scattered around the building. Previous surveys have also identified PCB-contamination inside of older light fixtures with replacement non-PCB-containing ballasts. The fluorescent light fixtures will be replaced as shown on the drawings.

Older HID lights may have PCB-containing ballasts. Due to height restrictions and sealed ballast enclosures, the HID fixtures were not able to be accessed. All HID lights shall be inspected during removal or relocation. If ballasts are not marked "No PCBs," we suggest contacting the manufacturer of the lights to determine if the ballasts contain PCB's, or assume that they contain PCB's and be disposed of as a hazardous waste. HID light fixtures with assumed PCB-containing ballasts will be replaced as shown on the drawings.

Bulk Products

Some older paints, sealants and other building materials may contain measurable amounts of PCB's. PCB use in paints and sealants was supposed to have been discontinued in 1979. The EPA does not require the sampling of bulk products, and no sampling of "Bulk Products" were authorized for this project.

6. Mercury-Containing Materials

Fluorescent Lamps

Fluorescent lamps use mercury to excite the phosphor crystals that coat the inside of the lamp. These lamps contain from 15 to 48 milligrams of mercury depending on their age and manufacturer. Fluorescent light fixtures will be replaced as shown on the drawings.

Thermostats

Older thermostats or other electrical switches that contain mercury have previously been noted in the building.

High Intensity Discharge Lamps

High Intensity Discharge (HID) lamps use mercury and sodium vapors in the lamp, and also typically have lead-containing solders at the bases. These lamps contain varying amounts of mercury depending on their age and manufacturer. HID light fixtures will be replaced as shown on the drawings.

Rubber Flooring

3M Brand Tartan Track or Gym Flooring and other rubber floors installed during the 1970s up through the mid 1990's often contained a mercury catalyst. The rubber flooring was typically installed in gymnasiums, locker rooms, gym storage, restrooms and on tracks. The mercury content of this flooring varies, as does the amount of degradation that has occurred over time and therefore the extent to which mercury can be leached from the flooring. The rubber flooring located in the Lower and Upper Gyms was previously tested and contain enough mercury to be classified as a hazardous waste. The rubber flooring is not anticipated to require disturbance by this project.

All mercury-containing items being removed by this project are required to be disposed of as hazardous waste or recycled.

7. Other Hazardous Materials**Self-Illuminating Exit Signs and Smoke Detectors**

No radioactive exit signs or smoke detectors were found in the renovation area but are known to be scattered throughout the building. No radioactive exit signs are scheduled to be replaced by this project. If any radioactive items are removed by this project, they are required to be disposed of as hazardous waste or recycled.

Hydraulic Lifts

There is a hydraulic lift for the Sports Complex elevator which will be demolished by this project. The hydraulic fluids shall be removed and properly disposed of prior to disposal of the metallic portions, or the entire unit may be reused or recycled by the contractor.

Soil Contamination

The scope of work for EHS-Alaska, Inc. did not include investigation of soils for petroleum or other contaminations.

Refrigerants

Refrigerators, freezers, ice machines, and water coolers have previously been identified in other areas of the building that are outside of the current project areas. Air conditioning units may also be present. Ozone depleting substances (ODS) are regulated by the EPA and must be removed by certified technicians prior to equipment disposal.

Heat Transfer Fluids

The existing heating system contains heat transfer fluids, including glycol or other boiler treatment chemicals. Any heat transfer fluids removed from the heating system shall be recovered and properly disposed of or recycled.

E. REGULATORY CONSTRAINTS**1. Asbestos-Containing Materials**

The Federal Occupational Safety and Health Administration (29 CFR 1926.1101) and the State of Alaska Department of Labor (8 AAC 61) have promulgated regulations requiring testing for airborne asbestos fibers; setting allowable exposure limits for workers potentially exposed to airborne asbestos fibers; establishing contamination controls, work practices, and medical surveillance; and setting worker certification and protection requirements. These regulations apply to all workplace activities involving asbestos-containing materials. No asbestos-containing materials are anticipated to be affected by this project, but the sprayed-on fireproofing and dusts with less than 1 percent asbestos will likely require disturbance as discussed above.

The EPA regulations, issued as Title 40 of the Code of Federal Regulations, Part 61 (40 CFR 61), Subpart M under the National Emission Standards for Hazardous Air Pollutants (NESHAP), established procedures

for handling ACM during asbestos removal and waste disposal. Bettye Davis East Anchorage High School will fall under the EPA's Asbestos Hazard Emergency Response Act (AHERA) law regulating asbestos in schools, and clearance sampling will be required where interior asbestos-containing materials are removed.

The EPA regulations require an owner (or the owner's contractor) to notify the EPA of asbestos removal operations and to establish responsibility for the removal, transportation, and disposal of asbestos-containing materials.

The disposal of asbestos waste is regulated by the EPA, the Alaska Department of Environmental Conservation, and the disposal site operator. Wastes being transported to the disposal site must be sealed in leak tight containers prior to disposal and must be accompanied by disposal permits and waste manifests.

2. Dusts with Asbestos

All of the dust samples taken at Bettye Davis East Anchorage High School through the years have contained less than 1 percent asbestos. The concentrations of asbestos structures per unit area of dust analyzed by ASTM D5756 are not directly comparable to the majority of dust sampling literature which use ASTM D5755 analysis due to differences in sample preparation. Both types of analysis include ultrasonic treatment to separate asbestos from interfering particulates. However, the D5756 method includes a much longer ultrasonication step that tends to break down the larger asbestos structures, such as bundles or groups of asbestos fibers into more simple, individual asbestos fibers to allow more accurate estimations of the weight of the fibers. That has a tendency to "create" multiple asbestos structures out of what was originally a single asbestos structure. Area concentrations for samples analyzed by ASTM D5756 for weight percentage may have a higher concentration than if the same sample was analyzed by ASTM D5755. This should not have any effect on the weight percentage results, as no asbestos structures are actually "created", but are just more finely divided. The structures per unit area results from ASTM D5756 analysis are given as a courtesy by the laboratory, and should be used as a general comparison of relative concentrations, and not compared to the ASTM D5755 analysis results or the indications of "background", "medium" or "high" concentrations as discussed below and in the published literature on the implications of asbestos in dusts. The differences between the two types of analysis will depend on the relative sizes of the asbestos structures present in the dusts. If the dust has mostly single fibers, there would not be much effect. If the dust has bundles, clusters or matrixes of asbestos present, the concentration of structures per unit area may be reported as much higher by ASTM D5756 analysis than if it was analyzed by ASTM D5755.

Concentrations of asbestos in dust are considered to be at "background" levels when the concentrations are between 1,000 to 10,000 St./cm² when analyzed by ASTM D5755. Background levels for a particular location will depend on many factors, including whether or not asbestos occurs naturally in soils in the area. Concentrations greater than approximately 100,000 St./cm² are considered to have a higher likelihood of causing an exposure to asbestos fibers when the settled dusts are disturbed. Concentrations between 10,000 and 100,000 St./cm² lie in a median range. In all cases, the possible airborne concentrations of asbestos will depend on the type of disturbance, the quantity of dust that is disturbed, and the volume of the area into which the dust is made airborne.

D5755-Area Concentration Samples

The asbestos in dust concentrations found in sampling at Bettye Davis East Anchorage High School ranged from 7,400.0 St./cm² to 83,000.0 St./cm² when analyzed by ASTM D5755. No "High" concentrations were found. Three of the four ASTM D5755 samples contained what is considered "medium" concentrations of asbestos and one sample was at "background" levels.

D5756-Weight Percentage Samples

The D5756 asbestos in dust concentrations found throughout Bettye Davis East Anchorage High School ranged from 24,000.0 St./cm² to 2,127,500.0 St./cm², several times higher than concentrations for those analyzed by ASTM D5755, and as discussed above, may not be comparable to the research that produced the above classifications of “background, medium and high” concentrations.

Likely sources of asbestos in dusts include natural occurrences of asbestos

The types of asbestos found in both types of samples included chrysotile, amosite, tremolite and actinolite forms of asbestos. 20 samples contained only chrysotile. Eight samples contained chrysotile and actinolite. One sample contained chrysotile, amosite and tremolite. One sample contained chrysotile, tremolite and actinolite. Because actinolite and tremolite have not been identified in bulk samples taken of materials within the school, those forms of asbestos may have come from natural occurrences of asbestos in an outside source, such as rock or ore deposits, which appear to be common in the Anchorage area.

Because the type of disturbance, concentration of asbestos in the dusts, quantity of dust disturbed, cohesiveness of the dusts and room sizes will change, the airborne asbestos levels expected during the project will depend on the contractor’s means and methods of conducting the work. The mere presence of asbestos in the dusts does not necessarily imply that a “hazard” exists which would require the use of specially trained workers to “abate” the “hazard”. All dusts will likely be required to be removed from the areas where asbestos-containing materials are being removed (abatement areas) in order to achieve clearances. The dusts in the other areas are to be controlled so as to limit worker exposures and prevent contamination of occupied areas of the building.

There is no established correlation between settled or adhered dusts with measurable concentrations of asbestos and airborne concentrations. The definition in the OSHA regulations of asbestos-containing materials as those materials that contain 1 percent or more asbestos by weight, apply to cohesive materials and not to dusts. The OSHA regulations are essentially “performance based”, if workers are exposed above the permissible exposure limits, then all of the requirements in the regulations become effective.

3. Lead-Containing Materials

The EPA Standard 40 CFR 745, Lead-Based Paint Poisoning Prevention in Certain Residential Structures, defines lead-based paint hazards and regulates lead based paint activities in target housing and child-occupied facilities. The requirements of this regulation include training certification, pre-work notifications, work practice standards and record keeping. Areas in facilities built before 1978 that are typically classified as child occupied facilities may include but are not limited to: residential homes, day care facilities, preschools, kindergarten classrooms, restrooms, multipurpose rooms, cafeterias, gyms, libraries and other areas routinely used by children under 6 years of age. New training requirements for Firms (Contractors) and Renovators (Workers) became effective on April 22, 2010.

The requirements apply to renovation, repair or painting activities that are NOT classified as “minor repair and maintenance activities” (as defined by the regulations), which take place in the “*child occupied*” portions of facilities. It is anticipated that only small amounts of lead based paint (if present) will be required to be disturbed for this renovation work, and the work would be classified as minor repair and maintenance activities, therefore most requirements of 40 CFR 745 do not apply.

Federal OSHA (29 CFR 1926.62) and the State of Alaska (8 AAC Chapter 61) have promulgated regulations that apply to all construction work where employees may be exposed to lead. The disturbance of any surfaces painted with lead-containing paint requires lead-trained personnel, personnel protective procedures, and air monitoring until exposure levels can be determined. If initial monitoring verifies that the work practices being used are not exposing workers, monitoring and protection procedures may be relaxed. Experience has shown that some paints in most buildings will contain low concentrations of lead and disturbance of those paints are still regulated under the OSHA lead standard, 29 CFR 1926.62. Low

levels of lead found by XRF testing does not mean that the paints are free of lead, the paints may contain lead, and OSHA regulations apply during any disturbance of measurable amounts of lead present in paints.

Because the type of disturbance, quantity of lead dusts, cohesiveness of the dusts and room sizes will change, the airborne lead levels expected during the project will depend on the contractor's means and methods of conducting the work. The mere presence of lead in the dusts does not necessarily imply that a "hazard" exists which would require the use of specially trained workers to "abate" the "hazard". As a comparison, "clearance" lead dust concentrations established at the conclusion of a "lead abatement project" in child occupied facilities, are required to be <10.0 µg/ft² for floors, <100.0 µg/ft² for window sills, and <400.0 µg/ft² for window troughs. Soil lead clearance levels shall be below 400 parts per million (ppm) for play areas and 1,200 ppm for bare soil in non-play areas.

The dust sampled in the building contained from <91.0 µg/ft² to 9,000.0 µg/ft², however, none of the samples were taken at the floors, window sills, or window troughs, but were taken in areas that were typically inaccessible, and are unlikely to be disturbed during normal occupancy. Clearance sampling meeting the requirements of 40 CFR 745 will be required if the work goes beyond the minimum amounts of disturbance of lead-based paints established by those regulations.

There is no established correlation between settled or adhered lead dust concentrations and airborne concentrations. The OSHA regulations are essentially "performance based", if workers are exposed above the permissible exposure limits, then all of the requirements in the regulations become effective.

The EPA requires that actual construction or demolition debris that contains lead or lead-containing paint or other heavy metals be tested using the TCLP test to determine if the waste must be treated as hazardous waste. All federal, state and local standards regulating lead and lead-containing wastes are required to be followed during the renovation or demolition of portions of this building. Lead-acid batteries and other batteries are classified by the EPA as Universal Wastes. The EPA encourages that all Universal Wastes be recycled in accordance with 40 CFR 273, or in the case of lead-acid batteries, in accordance with 40 CFR 266, subpart G.

If the TCLP tests done on the waste stream(s) that are produced by the contractor are found to be classified as hazardous wastes, then those waste stream(s) will have to be packaged for shipping and disposal in accordance with hazardous waste and transportation regulations. Because there are no hazardous waste landfills in Alaska, this report assumes that any hazardous waste disposal would take place in Seattle or elsewhere in the Pacific Northwest.

4. Suspect Fungal and Bacterial Growth

The American Industrial Hygiene Association (AIHA) lists guidelines for water sources to include potable water, cooling towers, fountains, humidifiers and misters, and hot tubs and spas for example, but we could not find a guideline for ground water sources not meant for drinking so we do not have a reference for unacceptable levels of Legionella in water sources other than that used for human use or consumption. However, the AIHA lists interpretation guideline that indicate "possible amplification" is occurring at levels between 100,00-1,000,000 CFU/L and "amplification" is occurring at levels above 1,000,000 CFU/L in Cooling Towers. Cooling towers are actively aerosolizing water vapors, and have resulted in many Legionella episodes in the past. Because of the high Legionella concentrations found in stagnant water puddled on top of the ductwork, these results suggest that amplification is occurring and there is a potential for Legionella to be conveyed to other areas served by the HVAC system resulting in occupant exposure to Legionella.

The standing water in the Utiliduct between the east and west portions of the building is isolated, does not have any air-flow, and is currently outside of the area of work for this project. Water infiltration at the Utiliduct will be addressed at some future date.

5. PCB-Containing Materials

The EPA has promulgated regulations (40 CFR Part 761) that cover the proper handling and disposal of PCB-containing materials. The PCB-containing equipment being removed by this project is required to be disposed of at fully permitted hazardous waste facilities. The EPA regulates liquid PCBs differently from non-liquid materials. Workers who remove or handle PCB-containing or PCB-contaminated materials or who transport or dispose of PCB wastes must be trained and certified in hazardous waste operations and emergency response (HAZWOPER) as required by 29 CFR 1910.120 and the State of Alaska Department of Labor (8 AAC 61). The Department of Transportation under 49 CFR Parts 100-199 regulates the marking, packaging, handling and transportation of hazardous materials. All federal, state and local standards regulating PCBs and PCB waste must be followed during this project.

6. Mercury-Containing Materials

Thermostats and mercury-containing lamps are classified by the EPA as Universal Wastes. The EPA encourages that all Universal Wastes be recycled in accordance with 40 CFR 273. Mercury and mercury-containing products are considered hazardous waste if TCLP testing of the waste for mercury confirms the mercury content to be greater than the EPA criteria of 0.2 mg/l.

7. Other Hazardous Materials

Refrigerants

No refrigerators, freezers, ice machines, water coolers, or air condition units are scheduled for removal by this project but have been previously identified in the building. Typically, refrigeration and air conditioning systems with ODS shall be maintained in order to prevent discharge of ODS. Systems that are to be removed or dismantled shall have refrigerants containing ODS recovered and disposed of or recycled in accordance with 40 CFR 82.

Chemical Hazards

The EPA has promulgated regulations (40 CFR Parts 260 to 299 amongst others) that cover the proper handling and disposal of waste chemicals, including listed wastes, which are ignitable, corrosive, reactive, toxic, or an acute hazardous waste or wastes that exhibit the characteristics of toxicity. All construction workers who are required to remove or handle chemical hazards or to transport or dispose of chemical wastes shall be trained and certified as required by the U.S. Department of Labor (29 CFR 1910.120) and the State of Alaska Department of Labor (8 AAC 61). Transportation of chemical hazards are regulated by Department of Transportation regulations under 49 CFR Parts 171 to 178 amongst others.

Waste heat transfer fluids (such as used heating/cooling system glycol or other circulating heating/cooling fluids) are a potentially hazardous waste and are required to be TCLP tested prior to disposal to determine if the fluids are classified as hazardous or non-hazardous waste per the EPA's RCRA regulations governing hazardous wastes. According to a study performed by the University of Northern Iowa, standard TCLP analysis using ICP SW 6010 testing procedures commonly report levels of Arsenic and Selenium over regulatory thresholds due to interferences in the matrix. That report concluded that additional analysis should be performed to refute the presence of Arsenic or Selenium over the regulatory levels by either mass spectrometry using method SW 6020, or by graphite furnace using method SW 7060. Some heat transfer fluids may also contain potentially hazardous additives that modify the properties of the fluids for use in a particular system. It is recommended that the contractor consult with the persons responsible for maintaining the system to determine if any additives that may be potentially hazardous were used in the system to further determine disposal requirements.

Radioactive Materials

Self-luminous products that contain Tritium, Krypton-85, or Promethium-147 are considered radioactive. There are special disposal requirements for products that contain Tritium, Krypton-85, or Promethium-147 that are generally licensed. Data from the Nuclear Regulatory Commission (NRC) indicates that most all Tritium powered exit signs are generally licensed and therefore must be disposed of at a licensed disposal

facility or returned to the manufacturer/distributor for disposal. Licensed radioactive products are regulated by Nuclear Regulatory Commission standard 10 CFR 20 and 10 CFR 32. Smoke detectors were present in the project area that may contain a radioactive material. If the detectors are of the ionization type they typically contain a small amount of Americium. If removed during renovation, the detectors should be returned to the owner for reuse or returned to the manufacturer for disposal or recycling. There are no licensed disposal facilities for radioactive wastes in Alaska.

F. RECOMMENDATIONS

1. Asbestos-Containing Materials

The asbestos-containing materials identified in the building are typically in intact condition and are classified as both friable and non-friable ACM. All asbestos-containing materials that will be disturbed by the planned renovation work are required to be removed by trained asbestos workers. Refer to Section 02 82 33 Removal and Disposal of Asbestos Containing Materials.

2. Dusts with Asbestos

Dusts with measurable concentrations of asbestos have previously been identified in the building but are not classified as asbestos-containing materials, or as debris from asbestos-containing materials. Workers disturbing dusts are required to have hazard communication training in accordance with OSHA regulations, but are not required to receive 40 hours of training, which is required for asbestos workers. The contractor will need to choose means and methods to control worker exposures to airborne contaminants. At least an initial exposure assessment or data from previous air monitoring is needed to show that worker exposures are maintained below the OSHA permissible exposure limits (PELs). Refer to Section 01 35 45 Airborne Contaminant Control.

3. Lead-Containing Materials

Federal OSHA (29 CFR 1926.62) and the State of Alaska (8 AAC Chapter 61) have promulgated regulations that apply to all construction work where employees may be exposed to lead, including disturbance of paints with low concentrations of lead.

The EPA Standard 40 CFR 745, Lead-Based Paint Poisoning Prevention in Certain Residential Structures, defines lead-based paint hazards and regulates lead based paint activities in target housing and child-occupied facilities. Contractors disturbing lead-based paints in target housing and child occupied facilities must comply with 40 CFR 745.

Worker exposure to lead may be able to be controlled below the OSHA permissible exposure limit if proper engineering controls and procedures are used during renovation. Lead is a potentially hazardous waste and the EPA requires that all wastes that contains lead be tested to determine if they must be treated as hazardous waste. A TCLP test of the waste stream(s) produced by the Contractor's means and methods are required to be performed to determine if those wastes will be classified as hazardous or non-hazardous. Refer to Section 01 35 45 Airborne Contaminant Control and Section 02 83 33 Removal and Disposal of Materials Containing Lead.

4. Suspect Fungal and Bacterial growth

The portions of the ductwork which have visibly been impacted by water in the past are recommended to be wet-wiped with a bleach solution, and treated with a bactericide that is compatible with the materials, and intended for use inside ductwork.

The visible mold growth and damaged gypsum wall board at the Lower Fan Room NWL106, is recommended to be removed to a point at least 2 feet away from the last visible suspect fungal growth, and to be cleaned in accordance with the Institute of Inspection Cleaning and Restoration (IICRC) Standard and

Reference Guide for Professional Mold Remediation, IICRC S520. The affected gypsum wall board also has asbestos-containing joint compounds, so the removal and repairs will need to comply with the asbestos regulations listed above.

5. PCB-Containing Materials

PCB-containing ballasts scheduled for removal or replacement will need to be removed, handled, packaged and disposed of in accordance with all regulations. Refer to Section 02 84 18 Removal and Disposal of Chemical Hazards.

6. Mercury-Containing Materials

Mercury-containing materials scheduled for removal or replacement will need to be removed, handled, packaged and disposed of in accordance with all regulations. If mercury-containing lamps and thermostats are handled and disposed of in accordance with the Universal Waste Regulations, no TCLP test is required. If the Contractor chooses to perform a TCLP test of fluorescent lamps, the test shall be conducted in accordance with the requirements of ANSI/NEMA Standard Procedure for Fluorescent Lamp Sample Preparation and Toxicity Characteristic Leaching Procedure, C78.LL 1256-2003 or latest version. Refer to Section 02 84 18 Removal and Disposal of Chemical Hazards.

6. Other Hazardous Materials

If any radioactive materials are removed or replaced, they will need to be removed, handled, packaged and disposed of in accordance with all regulations. Refer to Section 02 84 18 Removal and Disposal of Chemical Hazards.

If any ODS are removed or replaced, they will need to be removed, handled, packaged and disposed of in accordance with all regulations. Refer to Section 02 84 18 Removal and Disposal of Chemical Hazards.

The hydraulic fluids or units shall be removed and properly disposed of in accordance with all regulations and the requirements of the disposal site. Refer to Section 02 84 18 Removal and Disposal of Chemical Hazards.

If any heat transfer fluids are removed or replaced, they will need to be removed, handled, packaged and disposed of in accordance with all regulations. Refer to Section 02 84 18 Removal and Disposal of Chemical Hazards.

G. LIMITATIONS

The conclusions and recommendations contained in this report are based upon professional opinions with regard to the subject matter. These opinions have been arrived at in accordance with currently accepted environmental consulting and engineering standards and practices and are subject to the following inherent limitations:

1. Accuracy of Information

The laboratory reports utilized in this assessment were provided by the accredited laboratories cited in this report. Although the conclusions, opinions, and recommendations are based in part, on such information, our services did not include the verification of accuracy or authenticity of such reports. Should such information provided be found to be inaccurate or unreliable, EHS-Alaska, Inc. reserves the right to amend or revise its conclusions, opinions, and/or recommendations.

2. Site Conditions

This limited survey did not include investigation of the entire site and may not be valid outside the survey area. The intent of this survey was to identify common hazardous materials that may be disturbed during the planned renovations. This survey is not intended to be utilized as the sole design document for abatement. This survey was conducted while the site was occupied. All inspections were performed with furniture, equipment and/or stored items in place. The scope of work for this survey did not include identification of all potentially hazardous materials that may be present at this site, and was limited to the scope of work agreed upon with our client. Although a concerted effort was made to identify those common hazardous materials likely to be affected by this project, some hazardous materials may have been hidden by furniture, equipment or stored items and may not have been identified. The survey investigated representative materials and items, such as lights and mechanical components. Variations may occur between materials and items that appear to be the same, but are actually of different construction or materials. Other asbestos-containing or potentially hazardous materials may be present in the facilities that were concealed by structural members, walls, ceilings or floor coverings, or in materials where testing was not conducted.

3. Changing Regulatory Constraints

The regulations concerning hazardous materials are constantly changing, including the interpretations of the regulations by the local and national regulating agencies. Should the regulations or their interpretation be changed from our current understanding, EHS-Alaska, Inc. reserves the right to amend or revise its conclusions, opinions, and/or recommendations.

APPENDIX A

Asbestos Bulk Sample Field Survey Data Sheets and Laboratory Reports

Field Data Sheets and Laboratory Reports
Not Included to Save Paper,

Refer to Summarized Results in this Report

Reports Are Available for Review,
Or Electronically Through the ASD Offices

APPENDIX B

Dust Sampling for Asbestos Field Survey Data Sheets and Laboratory Reports

Field Data Sheets and Laboratory Reports
Not Included to Save Paper,

Refer to Summarized Results in this Report

Reports Are Available for Review,
Or Electronically Through the ASD Offices

APPENDIX C

Lead Dust Sample Field Survey Data Sheets and Laboratory Reports

Field Data Sheets and Laboratory Reports
Not Included to Save Paper,

Refer to Summarized Results in this Report

Reports Are Available for Review,
Or Electronically Through the ASD Offices

APPENDIX D

Lead Analyzer Test Results

LEAD ANALYZER TEST RESULTS

Heuresis Pb200i, Serial No. 1770

NO.	SITE	INSPECTOR	FLOOR	ROOM	COMPONENT	SUBSTRATE	CONDITION	COLOR	DURATION	TIME	RESULTS		
											LBP	mg/cm ²	+/- ERROR
1	ASD EAST HIGH SCHOOL	Hill	-	-	CALIBRATION	-	-	GREEN	5	10/29/20 16:01:33	POSITIVE	1.1	0.1
2	ASD EAST HIGH SCHOOL	Hill	-	-	CALIBRATION	-	-	GREEN	5	10/29/20 16:01:46	POSITIVE	1.1	0.1
3	ASD EAST HIGH SCHOOL	Hill	-	-	CALIBRATION	-	-	GREEN	5	10/29/20 16:01:59	POSITIVE	1.1	0.1
4	ASD EAST HIGH SCHOOL	Hill	UPPER	E. BENSON WALKWAY	DOOR	METAL	INTACT	GREEN	5.61	10/29/20 16:06:00	NEGATIVE	0.09	0.13
5	ASD EAST HIGH SCHOOL	Hill	UPPER	E. BENSON WALKWAY	DOOR FRAME	METAL	INTACT	GREEN	3.41	10/29/20 16:06:20	NEGATIVE	0.59	0.16
6	ASD EAST HIGH SCHOOL	Hill	UPPER	E. BENSON WALKWAY	WALL	CEMENT BOARD	INTACT	WHITE	4.81	10/29/20 16:11:07	NEGATIVE	0.24	0.14
7	ASD EAST HIGH SCHOOL	Hill	UPPER	E. BENSON WALKWAY	COLUMN	CEMENT BOARD	INTACT	WHITE	4.87	10/29/20 16:11:37	NEGATIVE	0.26	0.14
8	ASD EAST HIGH SCHOOL	Hill	UPPER	E. BENSON WALKWAY	WALL	CEMENT BOARD	INTACT	RED	5.41	10/29/20 16:12:03	NEGATIVE	0.16	0.13
9	ASD EAST HIGH SCHOOL	Hill	UPPER	E. BENSON WALKWAY	WALL	CEMENT BOARD	INTACT	BLUE	5.56	10/29/20 16:13:29	NEGATIVE	0.22	0.13
10	ASD EAST HIGH SCHOOL	Hill	MIDDLE	E. BENSON WALKWAY	RADIATOR	METAL	INTACT	BEIGE	6.16	10/29/20 16:14:11	NEGATIVE	0.14	0.12
11	ASD EAST HIGH SCHOOL	Hill	MIDDLE	E. BENSON WALKWAY	WALL	CONCRETE	INTACT	WHITE	5.55	10/29/20 16:14:55	NEGATIVE	0.23	0.13
12	ASD EAST HIGH SCHOOL	Hill	UPPER	E. BENSON WALKWAY	LOCKER	METAL	INTACT	BLUE	5.6	10/29/20 16:16:21	NEGATIVE	0.09	0.13
13	ASD EAST HIGH SCHOOL	Hill	MIDDLE	E. BENSON WALKWAY	DOOR	METAL	INTACT	BLACK	5.74	10/29/20 16:16:55	NEGATIVE	0.02	0.12
14	ASD EAST HIGH SCHOOL	Hill	MIDDLE	E. BENSON WALKWAY	DOOR FRAME	METAL	INTACT	BROWN	5.93	10/29/20 16:17:25	NEGATIVE	0.19	0.12
15	ASD EAST HIGH SCHOOL	Hill	MIDDLE	E. BENSON WALKWAY	HAND RAIL	WOOD	INTACT	VARNISH	5.93	10/29/20 16:18:18	NEGATIVE	0.22	0.12
16	ASD EAST HIGH SCHOOL	Hill	LOWER	E. BENSON WALKWAY	RADIATOR	METAL	INTACT	BEIGE	5.95	10/29/20 16:19:56	NEGATIVE	0.13	0.12
17	ASD EAST HIGH SCHOOL	Hill	LOWER	E. BENSON WALKWAY	WALL	CONCRETE	INTACT	WHITE	5.33	10/29/20 16:20:32	NEGATIVE	0.13	0.13
18	ASD EAST HIGH SCHOOL	Hill	LOWER	E. BENSON WALKWAY	DOOR FRAME	METAL	INTACT	GREEN	6.12	10/29/20 16:21:06	NEGATIVE	0.65	0.12
19	ASD EAST HIGH SCHOOL	Hill	LOWER	E. BENSON WALKWAY	WALL	CONCRETE	INTACT	WHITE	5.45	10/29/20 16:21:51	NEGATIVE	0.07	0.13
20	ASD EAST HIGH SCHOOL	Hill	LOWER	E. BENSON WALKWAY	FLOOR	CONCRETE	INTACT	OFF-WHITE	5.37	10/29/20 16:23:13	NEGATIVE	0.29	0.13
21	ASD EAST HIGH SCHOOL	Hill	LOWER	E. BENSON WALKWAY	LOCKER	METAL	INTACT	BLUE	6.82	10/29/20 16:23:59	NEGATIVE	0.09	0.11
22	ASD EAST HIGH SCHOOL	Hill	LOWER	E. BENSON WALKWAY	WALL	CEMENT BOARD	INTACT	BLUE	6.04	10/29/20 16:24:40	NEGATIVE	0.17	0.12
23	ASD EAST HIGH SCHOOL	Hill	LOWER	E. BENSON WALKWAY	WALL	CEMENT BOARD	INTACT	WHITE	5.7	10/29/20 16:25:07	NEGATIVE	0.37	0.13
24	ASD EAST HIGH SCHOOL	Hill	MIDDLE	E. BENSON WALKWAY	FLOOR	RUBBER	INTACT	BLUE	5.36	10/29/20 16:26:20	NEGATIVE	0.18	0.13
25	ASD EAST HIGH SCHOOL	Hill	MIDDLE	E. BENSON WALKWAY	WALL	CONCRETE	INTACT	WHITE	5.26	10/29/20 16:28:30	NEGATIVE	0.09	0.13
26	ASD EAST HIGH SCHOOL	Hill	UPPER	E. BENSON WALKWAY	WINDOW CASING	METAL	INTACT	BLACK	7.14	10/29/20 16:29:10	NEGATIVE	0.39	0.11
27	ASD EAST HIGH SCHOOL	Hill	UPPER	E. BENSON WALKWAY	HAND RAIL	METAL	INTACT	BLACK	5.77	10/29/20 16:30:31	NEGATIVE	0.15	0.12
28	ASD EAST HIGH SCHOOL	Hill	UPPER	E. BENSON WALKWAY	WALL	CMU	INTACT	WHITE	5.48	10/29/20 16:31:13	NEGATIVE	0.18	0.13
29	ASD EAST HIGH SCHOOL	Hill	SECOND	N. BENSON BRIDGE	DOOR	METAL	INTACT	RED	5.22	10/29/20 16:38:39	NEGATIVE	0.06	0.13
30	ASD EAST HIGH SCHOOL	Hill	SECOND	N. BENSON BRIDGE	DOOR FRAME	METAL	INTACT	RED	5.52	10/29/20 16:39:00	NEGATIVE	0.12	0.13
31	ASD EAST HIGH SCHOOL	Hill	SECOND	N. BENSON BRIDGE	WALL	CEMENT BOARD	INTACT	WHITE	5.78	10/29/20 16:39:31	NEGATIVE	0.33	0.12
32	ASD EAST HIGH SCHOOL	Hill	SECOND	N. BENSON BRIDGE	COLUMN	CEMENT BOARD	INTACT	WHITE	5.84	10/29/20 16:39:58	NEGATIVE	0.24	0.12
33	ASD EAST HIGH SCHOOL	Hill	SECOND	N. BENSON BRIDGE	HAND RAIL	METAL	INTACT	RED	5.72	10/29/20 16:42:44	NEGATIVE	0.11	0.13
34	ASD EAST HIGH SCHOOL	Hill	SECOND	N. BENSON BRIDGE	HAND RAIL	METAL	INTACT	RED	5.42	10/29/20 16:43:06	NEGATIVE	0.08	0.13
35	ASD EAST HIGH SCHOOL	Hill	SECOND	N. BENSON BRIDGE	WALL	CEMENT BOARD	INTACT	WHITE	5.58	10/29/20 16:44:00	NEGATIVE	0.22	0.13
36	ASD EAST HIGH SCHOOL	Hill	SECOND	N. BENSON BRIDGE	WINDOW CASING	METAL	INTACT	BLACK	5.67	10/29/20 16:45:41	NEGATIVE	0.22	0.13
37	ASD EAST HIGH SCHOOL	Hill	SECOND	N. BENSON BRIDGE	WINDOW CASING	METAL	INTACT	BLACK	5.06	10/29/20 16:46:06	NEGATIVE	0.2	0.13
38	ASD EAST HIGH SCHOOL	Hill	SECOND	N. BENSON BRIDGE	FLOOR	VINYL	INTACT	OFF-WHITE	5.52	10/29/20 16:46:49	NEGATIVE	0.13	0.13
39	ASD EAST HIGH SCHOOL	Hill	GROUND	GYM ELEVATOR ROOM	DOOR	METAL	INTACT	PURPLE	5.44	10/29/20 16:53:56	NEGATIVE	0.04	0.13
40	ASD EAST HIGH SCHOOL	Hill	GROUND	GYM ELEVATOR ROOM	DOOR FRAME	METAL	INTACT	BEIGE	5.29	10/29/20 16:54:34	NEGATIVE	0.12	0.13
41	ASD EAST HIGH SCHOOL	Hill	GROUND	GYM ELEVATOR ROOM	WALL	DRYWALL	INTACT	WHITE	5.36	10/29/20 16:55:47	NEGATIVE	0.2	0.13
42	ASD EAST HIGH SCHOOL	Hill	GROUND	GYM ELEVATOR ROOM	WALL	DRYWALL	INTACT	WHITE	5.61	10/29/20 16:56:02	NEGATIVE	0.21	0.13
43	ASD EAST HIGH SCHOOL	Hill	GROUND	GYM ELEVATOR ROOM	WINDOW CASING	METAL	INTACT	BLACK	5.71	10/29/20 16:56:32	NEGATIVE	0.21	0.13
44	ASD EAST HIGH SCHOOL	Hill	GROUND	GYM ELEVATOR ROOM	DOOR	METAL	INTACT	PURPLE	4.7	10/29/20 16:57:09	NEGATIVE	0.06	0.14
45	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	DOOR	METAL	INTACT	BLUE	5.57	10/29/20 17:00:17	NEGATIVE	0.1	0.13
46	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	DOOR	METAL	INTACT	RED	6.29	10/29/20 17:00:50	NEGATIVE	0.09	0.12
47	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	COLUMN	DRYWALL	INTACT	WHITE	5.51	10/29/20 17:01:55	NEGATIVE	0.24	0.13
48	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	COLUMN	WOOD	INTACT	WHITE	6.25	10/29/20 17:02:23	NEGATIVE	0.17	0.12
49	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	WALL	DRYWALL	INTACT	WHITE	5.67	10/29/20 17:03:26	NEGATIVE	0.16	0.13
50	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	RADIATOR	METAL	INTACT	WHITE	5.03	10/29/20 17:03:59	NEGATIVE	0.16	0.13
51	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	WINDOW CASING	METAL	INTACT	BLACK	5.32	10/29/20 17:05:29	NEGATIVE	0.34	0.13
52	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	WALL	WOOD	INTACT	WHITE	6.7	10/29/20 17:06:56	NEGATIVE	0.2	0.12
53	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	DOOR	METAL	INTACT	BLACK	5.39	10/29/20 17:07:37	NEGATIVE	0.05	0.13

LEAD ANALYZER TEST RESULTS

NO.	SITE	INSPECTOR	FLOOR	ROOM	COMPONENT	SUBSTRATE	CONDITION	COLOR	DURATION	TIME	RESULTS		
											LBP	mg/cm ²	+/- ERROR
54	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	DOOR FRAME	METAL	INTACT	BROWN	7.12	10/29/20 17:08:04	NEGATIVE	0.18	0.11
55	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	WALL	CONCRETE	INTACT	WHITE	5.21	10/29/20 17:11:02	NEGATIVE	0.23	0.13
56	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	WALL	CONCRETE	INTACT	GREEN	4.45	10/29/20 17:11:37	NEGATIVE	0.5	0.14
57	ASD EAST HIGH SCHOOL	Hill	SECOND	GYM BRIDGE	WALL	CONCRETE	INTACT	BLUE	5.63	10/29/20 17:12:04	NEGATIVE	0.44	0.13
58	ASD EAST HIGH SCHOOL	Hill	GROUND	EXTERIOR	WALL	CONCRETE	INTACT	BLUE	4.66	10/29/20 17:15:39	NEGATIVE	0.02	0.14
59	ASD EAST HIGH SCHOOL	Hill	GROUND	EXTERIOR	COLUMN	CONCRETE	INTACT	BLUE	5.95	10/29/20 17:16:15	NEGATIVE	0.3	0.12
60	ASD EAST HIGH SCHOOL	Hill	GROUND	EXTERIOR	WALL	CONCRETE	INTACT	WHITE	5.49	10/29/20 17:16:57	NEGATIVE	-0.06	0.13
61	ASD EAST HIGH SCHOOL	Hill	-	-	CALIBRATION	-	-	GREEN	5	10/29/20 17:23:43	POSITIVE	1	0.1
62	ASD EAST HIGH SCHOOL	Hill	-	-	CALIBRATION	-	-	GREEN	5	10/29/20 17:23:56	POSITIVE	1.1	0.1
63	ASD EAST HIGH SCHOOL	Hill	-	-	CALIBRATION	-	-	GREEN	5	10/29/20 17:24:09	POSITIVE	1	0.1

Table Heading Descriptions:

Duration: This is the nominal time in "source" seconds that each sample was analyzed.

LBP: Results are shown as positive (POS \geq 1.0 mg/cm²) or negative (NEG < 1.0 mg/cm²). Positive results are shown in bold print.

mg/cm²: This is the testing results produced by the Heuresis Pb200i instrument in milligrams of lead per square centimeter (mg/cm²). The EPA defines lead based paint as paint containing lead at 1.0 mg/cm² or greater. A negative number is a result of an internal computation made by the instrument and should be interpreted as zero. Even though paint may be termed negative (less than 1.0 mg/cm²) by EPA definition, disturbance of the paint may still be regulated by OSHA under 29 CFR 1926.62. Where lead is present at any level, appropriate engineering controls, work practices and personal protective equipment should be used until a negative exposure assessment can be determined. <LOD indicates that the lead present was less than the limits of detection of the instrument (very little or no lead present).

VOID: This indicates that the test was intentionally terminated by the operator due to operator error (e.g. - operator moved analyzer while testing).

Substrate: Where ceramic is shown as a substrate, lead content is typically from the glazing on the tile unless the tile is painted.

LEAD PAINT SCREENING SUMMARY

Heuresis Pb200i, Serial No. 1770

NO.	SITE	INSPECTOR	FLOOR	ROOM	COMPONENT	SUBSTRATE	CONDITION	COLOR	DURATION	TIME	RESULTS		
											LBP	mg/cm ²	+/- ERROR
1	EAST HS GYM	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.43	9/30/18 10:47:24	POSITIVE	1.06	0.07
2	EAST HS GYM	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.37	9/30/18 10:48:10	POSITIVE	1.07	0.07
3	EAST HS GYM	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.51	9/30/18 10:49:13	POSITIVE	1.03	0.07
4	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	WALL	PLASTER	INTACT	WHITE	6.99	9/30/18 10:50:45	NEGATIVE	-0.12	0.11
5	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	DOOR	METAL	INTACT	BLUE	6.83	9/30/18 10:51:22	NEGATIVE	0.12	0.11
6	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	DOOR FRAME	METAL	INTACT	BLUE	5.77	9/30/18 10:51:47	NEGATIVE	0.14	0.12
7	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	FLOOR	CONCRETE	INTACT	WHITE	6.02	9/30/18 10:52:32	NEGATIVE	0.13	0.12
8	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	FLOOR	CONCRETE	INTACT	BLUE	6.91	9/30/18 10:53:30	NEGATIVE	0.29	0.11
9	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	LOCKER	METAL	INTACT	BLUE	6.57	9/30/18 10:54:10	NEGATIVE	0.12	0.12
10	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	LOCKER	METAL	INTACT	ORANGE	7.87	9/30/18 10:54:41	NEGATIVE	0.37	0.11
11	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	LOCKER	METAL	INTACT	OFF-WHITE	5.75	9/30/18 10:55:34	NEGATIVE	0.24	0.12
12	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	LOCKER	METAL	INTACT	BLUE	5.52	9/30/18 10:55:59	NEGATIVE	0.16	0.13
13	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	LOCKER	METAL	INTACT	TEAL	6.76	9/30/18 10:56:54	NEGATIVE	0.31	0.12
14	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	LOCKER	METAL	INTACT	BLACK	6.18	9/30/18 10:57:40	NEGATIVE	0.13	0.12
15	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	DOOR	METAL	INTACT	GRAY	5.63	9/30/18 10:59:44	NEGATIVE	0.28	0.13
16	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	DOOR	METAL	INTACT	RED	6.97	9/30/18 11:00:13	NEGATIVE	0.11	0.11
17	EAST HS GYM	OTTOSEN	FIRST	S BOY'S LOCKER	GATE	METAL	INTACT	BLUE	5.66	9/30/18 11:02:54	NEGATIVE	0.19	0.13
18	EAST HS GYM	OTTOSEN	FIRST	N BOY'S LOCKER	CEILING	PLASTER	INTACT	WHITE	6.49	9/30/18 11:27:58	NEGATIVE	-0.14	0.12
19	EAST HS GYM	OTTOSEN	FIRST	N BOY'S LOCKER	COLUMN	CONCRETE	INTACT	WHITE	5.76	9/30/18 11:28:34	NEGATIVE	0.3	0.12
20	EAST HS GYM	OTTOSEN	FIRST	N BOY'S LOCKER	WALL	CERAMIC	INTACT	YELLOW	4.89	9/30/18 11:29:32	POSITIVE	5.36	0.14
21	EAST HS GYM	OTTOSEN	FIRST	N BOY'S LOCKER	FLOOR	CERAMIC	INTACT	BROWN	6.1	9/30/18 11:30:07	NEGATIVE	0.22	0.12
22	EAST HS GYM	OTTOSEN	FIRST	N BOY'S LOCKER	WALL	CMU	INTACT	WHITE	4.76	9/30/18 11:30:57	NEGATIVE	0.15	0.14
23	EAST HS GYM	OTTOSEN	FIRST	N BOY'S LOCKER	DOOR	METAL	INTACT	WHITE	5.9	9/30/18 11:32:02	NEGATIVE	0.12	0.12
24	EAST HS GYM	OTTOSEN	FIRST	N BOY'S LOCKER	WALL	PLASTIC	INTACT	WHITE	6.23	9/30/18 11:32:29	NEGATIVE	0.14	0.12
25	EAST HS GYM	OTTOSEN	FIRST	N BOY'S LOCKER	PARTITION	PLASTIC	INTACT	WHITE	5.66	9/30/18 11:32:56	NEGATIVE	0.29	0.13
26	EAST HS GYM	OTTOSEN	FIRST	N BOY'S LOCKER	TOILET	CERAMIC	INTACT	WHITE	5.38	9/30/18 11:33:29	NEGATIVE	0.01	0.13
27	EAST HS GYM	OTTOSEN	FIRST	N BOY'S LOCKER	DRINKING FOUNTAIN	CERAMIC	INTACT	WHITE	5.53	9/30/18 11:34:24	NEGATIVE	0.11	0.13
28	EAST HS GYM	OTTOSEN	FIRST	N BOY'S LOCKER	HAND DRYER	CERAMIC	INTACT	WHITE	7.74	9/30/18 11:34:57	NEGATIVE	-0.07	0.11
29	EAST HS GYM	OTTOSEN	FIRST	N BOY'S LOCKER	DUCT	METAL	INTACT	WHITE	6.35	9/30/18 11:35:39	NEGATIVE	0.08	0.12
30	EAST HS GYM	OTTOSEN	FIRST	S CORRIDOR	WALL	CONCRETE	INTACT	WHITE	5.32	9/30/18 12:41:08	NEGATIVE	0.16	0.13
31	EAST HS GYM	OTTOSEN	FIRST	GYM LOBBY	DOOR	METAL	INTACT	PURPLE	4.63	9/30/18 12:41:53	NEGATIVE	-0.39	0.14
32	EAST HS GYM	OTTOSEN	FIRST	GYM LOBBY	DOOR FRAME	METAL	INTACT	BLUE	5.38	9/30/18 12:42:26	NEGATIVE	0.2	0.13
33	EAST HS GYM	OTTOSEN	FIRST	CORRIDOR	DOOR FRAME	METAL	INTACT	BLACK	6.4	9/30/18 12:43:21	NEGATIVE	0.19	0.12
34	EAST HS GYM	OTTOSEN	FIRST	GYM LOBBY	WALL	CONCRETE	INTACT	WHITE	5.31	9/30/18 12:44:20	NEGATIVE	0.19	0.13
35	EAST HS GYM	OTTOSEN	FIRST	GYM LOBBY	WALL	CONCRETE	INTACT	RED	5.32	9/30/18 12:44:45	NEGATIVE	0.18	0.13
36	EAST HS GYM	OTTOSEN	FIRST	GYM LOBBY	WALL	CONCRETE	INTACT	BLUE	5.6	9/30/18 12:45:12	NEGATIVE	0.2	0.13
37	EAST HS GYM	OTTOSEN	FIRST	GYM LOBBY	WALL	CERAMIC	INTACT	BLUE	5.63	9/30/18 12:46:20	NEGATIVE	0.12	0.13
38	EAST HS GYM	OTTOSEN	FIRST	GYM LOBBY	WALL	CERAMIC	INTACT	GRAY	5.66	9/30/18 12:46:51	NEGATIVE	0	0.13
39	EAST HS GYM	OTTOSEN	FIRST	GYM LOBBY	SOFFIT	PLASTER	INTACT	WHITE	5.6	9/30/18 12:49:46	NEGATIVE	0.38	0.13
40	EAST HS GYM	OTTOSEN	FIRST	GYM LOBBY	WALL	WOOD	INTACT	WHITE	6.57	9/30/18 12:51:57	NEGATIVE	0.17	0.12
41	EAST HS GYM	OTTOSEN	FIRST	GYM LOBBY	DRINKING FOUNTAIN	CERAMIC	INTACT	WHITE	5.67	9/30/18 12:52:47	NEGATIVE	-0.14	0.13
42	EAST HS GYM	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.45	9/30/18 12:54:48	NEGATIVE	0.99	0.07
43	EAST HS GYM	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.71	9/30/18 12:55:36	POSITIVE	1	0.07
44	EAST HS GYM	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.56	9/30/18 12:56:22	NEGATIVE	0.99	0.07
45	EAST HS GYM	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.86	9/30/18 14:26:03	POSITIVE	1.03	0.07
46	EAST HS GYM	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.73	9/30/18 14:26:50	POSITIVE	1.01	0.07
47	EAST HS GYM	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.43	9/30/18 14:27:37	POSITIVE	1.02	0.07
48	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	CHASE	WOOD	INTACT	WHITE	6.26	9/30/18 14:29:14	NEGATIVE	0.43	0.12

LEAD PAINT SCREENING SUMMARY

NO.	SITE	INSPECTOR	FLOOR	ROOM	COMPONENT	SUBSTRATE	CONDITION	COLOR	DURATION	TIME	RESULTS		
											LBP	mg/cm ²	+/- ERROR
49	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	DUCT	METAL	INTACT	WHITE	6.52	9/30/18 14:30:02	NEGATIVE	0.07	0.12
50	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	WALL	CONCRETE	INTACT	WHITE	5.38	9/30/18 14:30:39	NEGATIVE	0.16	0.13
51	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	BLEACHER	METAL	INTACT	BLACK	5.91	9/30/18 14:32:34	NEGATIVE	0.29	0.12
52	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	BLEACHER	PLASTIC	INTACT	BROWN	6.98	9/30/18 14:33:02	NEGATIVE	0.25	0.11
53	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	DOOR	METAL	INTACT	BLUE	5.48	9/30/18 14:34:09	NEGATIVE	0.18	0.13
54	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	DOOR FRAME	METAL	INTACT	BLUE	5.41	9/30/18 14:34:30	NEGATIVE	0.27	0.13
55	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	WALL	WOOD	INTACT	WHITE	5.71	9/30/18 14:34:58	NEGATIVE	0.36	0.13
56	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	FLOOR	RUBBER	INTACT	RED	5.76	9/30/18 14:35:52	NEGATIVE	0.17	0.12
57	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	FLOOR	RUBBER	INTACT	BLACK	5.6	9/30/18 14:36:21	NEGATIVE	0.22	0.13
58	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	FLOOR	RUBBER	INTACT	BLUE	5.35	9/30/18 14:36:54	NEGATIVE	0.16	0.13
59	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	FLOOR	RUBBER	INTACT	BLUE	5.43	9/30/18 14:37:12	NEGATIVE	0.1	0.13
60	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	CABINET	METAL	INTACT	GRAY	5.72	9/30/18 14:38:37	NEGATIVE	0.1	0.13
61	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	CABINET	METAL	INTACT	RED	5.65	9/30/18 14:39:09	NEGATIVE	0.38	0.13
62	EAST HS GYM	OTTOSEN	FIRST	LOWER GYM	CABINET	METAL	INTACT	RED	5.66	9/30/18 14:39:57	NEGATIVE	0.16	0.13
63	EAST HS GYM	OTTOSEN	SECOND	E GIRL'S LOCKER	FLOOR	CONCRETE	INTACT	RED	5.53	9/30/18 16:22:45	NEGATIVE	0.23	0.13
64	EAST HS GYM	OTTOSEN	SECOND	E GIRL'S LOCKER	FLOOR	CONCRETE	INTACT	GRAY	5.57	9/30/18 16:23:16	NEGATIVE	0.26	0.13
65	EAST HS GYM	OTTOSEN	SECOND	E GIRL'S LOCKER	FLOOR	CERAMIC	INTACT	BROWN	5.47	9/30/18 16:24:08	NEGATIVE	0.35	0.13
66	EAST HS GYM	OTTOSEN	SECOND	E GIRL'S LOCKER	FLOOR	CERAMIC	INTACT	BROWN	5.35	9/30/18 16:24:30	NEGATIVE	0.24	0.13
67	EAST HS GYM	OTTOSEN	SECOND	E GIRL'S LOCKER	DOOR	METAL	INTACT	RED	5.48	9/30/18 16:25:06	NEGATIVE	0.18	0.13
68	EAST HS GYM	OTTOSEN	SECOND	E GIRL'S LOCKER	DOOR FRAME	METAL	INTACT	RED	5.42	9/30/18 16:25:30	NEGATIVE	0.2	0.13
69	EAST HS GYM	OTTOSEN	SECOND	E GIRL'S LOCKER	WINDOW CASING	METAL	INTACT	RED	5.4	9/30/18 16:26:19	NEGATIVE	0.09	0.13
70	EAST HS GYM	OTTOSEN	SECOND	E GIRL'S LOCKER	WALL	CMU	INTACT	RED	5.34	9/30/18 16:26:54	NEGATIVE	0.23	0.13
71	EAST HS GYM	OTTOSEN	SECOND	E GIRL'S LOCKER	WALL	CMU	INTACT	WHITE	5.26	9/30/18 16:27:18	NEGATIVE	0.11	0.13
72	EAST HS GYM	OTTOSEN	SECOND	E GIRL'S LOCKER	WALL	PLASTER	INTACT	WHITE	7.26	9/30/18 16:28:24	NEGATIVE	-0.18	0.11
73	EAST HS GYM	OTTOSEN	SECOND	W GIRL'S LOCKER	HEATER SHROUD	METAL	INTACT	RED	5.61	9/30/18 16:35:38	NEGATIVE	0.13	0.13
74	EAST HS GYM	OTTOSEN	SECOND	W GIRL'S LOCKER	DOOR	METAL	INTACT	RED	5.45	9/30/18 16:36:11	NEGATIVE	0.79	0.13
75	EAST HS GYM	OTTOSEN	SECOND	W GIRL'S LOCKER	PARTITION	METAL	INTACT	RED	5.59	9/30/18 16:36:36	NEGATIVE	0.66	0.13
76	EAST HS GYM	OTTOSEN	SECOND	W GIRL'S LOCKER	WALL	CERAMIC	INTACT	OFF-WHITE	5.45	9/30/18 16:37:09	POSITIVE	8.12	0.13
77	EAST HS GYM	OTTOSEN	SECOND	W GIRL'S LOCKER	WALL	CMU	INTACT	RED	5.42	9/30/18 16:38:34	NEGATIVE	0.13	0.13
78	EAST HS GYM	OTTOSEN	SECOND	W GIRL'S LOCKER	WALL	DRYWALL	INTACT	OFF-WHITE	5.55	9/30/18 16:39:13	NEGATIVE	0.19	0.13
79	EAST HS GYM	OTTOSEN	SECOND	W GIRL'S LOCKER	CEILING	PLASTER	INTACT	WHITE	5.45	9/30/18 16:39:44	NEGATIVE	-0.15	0.13
80	EAST HS GYM	OTTOSEN	SECOND	W GIRL'S LOCKER	LOCKER	METAL	INTACT	BLUE	5.71	9/30/18 16:40:49	NEGATIVE	0.09	0.13
81	EAST HS GYM	OTTOSEN	SECOND	W GIRL'S LOCKER	LOCKER	METAL	INTACT	ORANGE	5.57	9/30/18 16:41:14	NEGATIVE	0.23	0.13
82	EAST HS GYM	OTTOSEN	SECOND	W GIRL'S LOCKER	LOCKER	METAL	INTACT	TEAL	5.6	9/30/18 16:42:06	NEGATIVE	0.17	0.13
83	EAST HS GYM	OTTOSEN	SECOND	W GIRL'S LOCKER	HAND DRYER	CERAMIC	INTACT	WHITE	3.32	9/30/18 16:42:39	NEGATIVE	0.28	0.16
84	EAST HS GYM	OTTOSEN	SECOND	S CORRIDOR	WALL	CONCRETE	INTACT	WHITE	5.45	9/30/18 16:44:47	NEGATIVE	0.23	0.13
85	EAST HS GYM	OTTOSEN	SECOND	UPPER GYM	WALL	PLASTER	INTACT	WHITE	5.4	9/30/18 16:45:29	NEGATIVE	0.15	0.13
86	EAST HS GYM	OTTOSEN	SECOND	UPPER GYM	DOOR	METAL	INTACT	RED	5.62	9/30/18 16:47:11	NEGATIVE	0.07	0.13
87	EAST HS GYM	OTTOSEN	SECOND	UPPER GYM	DOOR FRAME	METAL	INTACT	BLUE	5.29	9/30/18 16:47:35	NEGATIVE	0.14	0.13
88	EAST HS GYM	OTTOSEN	SECOND	UPPER GYM	WALL	WOOD	INTACT	WHITE	5.68	9/30/18 16:49:51	NEGATIVE	0.17	0.13
89	EAST HS GYM	OTTOSEN	SECOND	133	WALL	CMU	INTACT	WHITE	5.47	9/30/18 16:51:00	NEGATIVE	0.17	0.13
90	EAST HS GYM	OTTOSEN	SECOND	133	WALL	METAL	INTACT	BEIGE	6.22	9/30/18 16:51:44	NEGATIVE	0.22	0.12
91	EAST HS GYM	OTTOSEN	SECOND	N STORAGE	DOOR	METAL	INTACT	YELLOW	6.1	9/30/18 16:52:43	NEGATIVE	0.43	0.12
92	EAST HS GYM	OTTOSEN	SECOND	N STORAGE	DOOR FRAME	METAL	INTACT	YELLOW	5.1	9/30/18 16:53:05	NEGATIVE	0.51	0.13
93	EAST HS GYM	OTTOSEN	SECOND	N STORAGE	WALL	CERAMIC	INTACT	YELLOW	5.38	9/30/18 16:53:53	POSITIVE	5.49	0.13
94	EAST HS GYM	OTTOSEN	SECOND	N CORRIDOR	WALL	PLASTER	INTACT	OFF-WHITE	5.53	9/30/18 16:55:25	NEGATIVE	-0.08	0.13
95	EAST HS GYM	OTTOSEN	SECOND	N CORRIDOR	HEATER SHROUD	METAL	INTACT	WHITE	5.53	9/30/18 16:56:04	NEGATIVE	0.1	0.13
96	EAST HS GYM	OTTOSEN	SECOND	130	WALL	METAL	INTACT	BEIGE	5.56	9/30/18 16:57:54	NEGATIVE	0.16	0.13
97	EAST HS GYM	OTTOSEN	SECOND	130	TRIM	WOOD	INTACT	RED	6.45	9/30/18 16:58:24	NEGATIVE	-0.06	0.12

LEAD PAINT SCREENING SUMMARY

NO.	SITE	INSPECTOR	FLOOR	ROOM	COMPONENT	SUBSTRATE	CONDITION	COLOR	DURATION	TIME	RESULTS		
											LBP	mg/cm ²	+/- ERROR
98	EAST HS GYM	OTTOSEN	SECOND	130	TRIM	WOOD	INTACT	BLACK	5.51	9/30/18 16:58:50	NEGATIVE	0.04	0.13
99	EAST HS GYM	OTTOSEN	SECOND	130	WALL	WOOD	INTACT	BLUE	5.97	9/30/18 16:59:22	NEGATIVE	0.15	0.12
100	EAST HS GYM	OTTOSEN	SECOND	N FAN ROOM ACCESS	LADDER	METAL	INTACT	BLACK	4.9	9/30/18 17:01:53	NEGATIVE	0.23	0.14
101	EAST HS GYM	OTTOSEN	THIRD	N FAN ROOM	FLOOR	EPOXY	INTACT	BLUE	5.46	9/30/18 17:05:38	NEGATIVE	0.05	0.13
102	EAST HS GYM	OTTOSEN	THIRD	N FAN ROOM	LADDER	METAL	INTACT	RED	6.04	9/30/18 17:06:44	NEGATIVE	0.26	0.12
103	EAST HS GYM	OTTOSEN	THIRD	N FAN ROOM	DOOR	METAL	INTACT	WHITE	5.25	9/30/18 17:07:23	NEGATIVE	0.12	0.13
104	EAST HS GYM	OTTOSEN	THIRD	N FAN ROOM	DOOR FRAME	METAL	INTACT	WHITE	5.61	9/30/18 17:07:58	NEGATIVE	0.17	0.13
105	EAST HS GYM	OTTOSEN	THIRD	N FAN ROOM	WALL	CONCRETE	INTACT	WHITE	5.3	9/30/18 17:08:44	NEGATIVE	0.3	0.13
106	EAST HS GYM	OTTOSEN	THIRD	N FAN ROOM	WALL	DRYWALL	INTACT	WHITE	5.19	9/30/18 17:09:07	NEGATIVE	0.22	0.13
107	EAST HS GYM	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.51	9/30/18 17:22:11	POSITIVE	1	0.07
108	EAST HS GYM	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.49	9/30/18 17:22:57	NEGATIVE	0.98	0.07
109	EAST HS GYM	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.38	9/30/18 17:23:44	POSITIVE	1.01	0.07

Table Heading Descriptions:

Duration: This is the nominal time in "source" seconds that each sample was analyzed.

LBP: Results are shown as positive (POS \geq 1.0 mg/cm²) or negative (NEG < 1.0 mg/cm²). Positive results are shown in bold print.

mg/cm²: This is the testing results produced by the Heuresis Pb200i instrument in milligrams of lead per square centimeter (mg/cm²). The EPA defines lead based paint as paint containing lead at 1.0 mg/cm² or greater. A negative number is a result of an internal computation made by the instrument and should be interpreted as zero. Even though paint may be termed negative (less than 1.0 mg/cm²) by EPA definition, disturbance of the paint may still be regulated by OSHA under 29 CFR 1926.62. Where lead is present at any level, appropriate engineering controls, work practices and personal protective equipment should be used until a negative exposure assessment can be determined. <LOD indicates that the lead present was less than the limits of detection of the instrument (very little or no lead present).

VOID: This indicates that the test was intentionally terminated by the operator due to operator error (e.g. - operator moved analyzer while testing).

Substrate: Where ceramic is shown as a substrate, lead content is typically from the glazing on the tile unless the tile is painted.

LEAD PAINT SCREENING SUMMARY

Heuresis Pb200i, Serial No. 1770

NO.	SITE	INSPECTOR	FLOOR	ROOM	COMPONENT	SUBSTRATE	CONDITION	COLOR	DURATION	TIME	RESULTS		
											LBP	mg/cm ²	+/- ERROR
1	EAST HS POOL	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.5	10/15/18 13:10:21	NEGATIVE	0.96	0.07
2	EAST HS POOL	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.48	10/15/18 13:11:10	NEGATIVE	0.98	0.07
3	EAST HS POOL	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	21.39	10/15/18 13:11:58	NEGATIVE	0.98	0.06
4	EAST HS POOL	OTTOSEN	FIRST	WOMEN'S LOCKER ROOM	WALL	CMU	INTACT	YELLOW	10.39	10/15/18 13:14:39	NEGATIVE	0.22	0.09
5	EAST HS POOL	OTTOSEN	FIRST	WOMEN'S LOCKER ROOM	LOCKER BASE	CONCRETE	INTACT	YELLOW	5.4	10/15/18 13:16:12	NEGATIVE	0.2	0.13
6	EAST HS POOL	OTTOSEN	FIRST	WOMEN'S LOCKER ROOM	CEILING	CONCRETE	INTACT	YELLOW	5.42	10/15/18 13:17:24	NEGATIVE	-0.21	0.13
7	EAST HS POOL	OTTOSEN	FIRST	WOMEN'S LOCKER ROOM	WALL	CERAMIC	INTACT	PINK	5.39	10/15/18 13:18:18	POSITIVE	14.54	0.13
8	EAST HS POOL	OTTOSEN	FIRST	WOMEN'S LOCKER ROOM	WALL	CERAMIC	INTACT	PINK	3.56	10/15/18 13:18:54	POSITIVE	14.43	0.16
9	EAST HS POOL	OTTOSEN	FIRST	WOMEN'S LOCKER ROOM	FLOOR TILE	CERAMIC	INTACT	LT BROWN	5.62	10/15/18 13:19:45	NEGATIVE	0.23	0.13
10	EAST HS POOL	OTTOSEN	FIRST	WOMEN'S LOCKER ROOM	DOOR FRAME	METAL	FAIR	LT BROWN	10.28	10/15/18 13:20:48	NEGATIVE	0.41	0.09
11	EAST HS POOL	OTTOSEN	FIRST	WOMEN'S LOCKER ROOM	DOOR	METAL	FAIR	BLUE	10.41	10/15/18 13:21:28	NEGATIVE	0.11	0.09
12	EAST HS POOL	OTTOSEN	FIRST	WOMEN'S LOCKER ROOM	BENCH	METAL	INTACT	YELLOW	6.27	10/15/18 13:22:56	NEGATIVE	-0.03	0.12
13	EAST HS POOL	OTTOSEN	FIRST	LOCK BOX ROOM	WALL	CMU	INTACT	OFF-WHITE	5.29	10/15/18 14:02:56	NEGATIVE	0.23	0.13
14	EAST HS POOL	OTTOSEN	FIRST	LOCK BOX ROOM	CEILING	PLASTER	INTACT	GRAY	5.72	10/15/18 14:03:56	NEGATIVE	0.41	0.13
15	EAST HS POOL	OTTOSEN	FIRST	MEN'S LOCKER ENTRY	DOOR FRAME	METAL	INTACT	GRAY	5.43	10/15/18 14:04:37	NEGATIVE	0.15	0.13
16	EAST HS POOL	OTTOSEN	FIRST	MEN'S LOCKER ENTRY	DOOR	METAL	INTACT	BLUE	5.58	10/15/18 14:05:03	NEGATIVE	0.14	0.13
17	EAST HS POOL	OTTOSEN	FIRST	MEN'S LOCKER ENTRY	WALL	CMU	INTACT	YELLOW	5.31	10/15/18 14:05:55	NEGATIVE	0.23	0.13
18	EAST HS POOL	OTTOSEN	FIRST	MEN'S LOCKER ROOM	WALL	CMU	INTACT	YELLOW	5.43	10/15/18 14:07:23	NEGATIVE	0.2	0.13
19	EAST HS POOL	OTTOSEN	FIRST	MEN'S LOCKER ROOM	WALL	CONCRETE	INTACT	YELLOW	5.39	10/15/18 14:08:40	NEGATIVE	0.23	0.13
20	EAST HS POOL	OTTOSEN	FIRST	MEN'S LOCKER ROOM	WALL	CERAMIC	INTACT	PINK	3.4	10/15/18 14:09:20	POSITIVE	16.59	0.16
21	EAST HS POOL	OTTOSEN	FIRST	MEN'S LOCKER ROOM	CEILING	PLASTER	INTACT	YELLOW	5.39	10/15/18 14:09:59	NEGATIVE	-0.17	0.13
22	EAST HS POOL	OTTOSEN	FIRST	JANITOR'S ROOM	WALL	CMU	INTACT	YELLOW	5.4	10/15/18 14:11:01	NEGATIVE	0.22	0.13
23	EAST HS POOL	OTTOSEN	FIRST	JANITOR'S ROOM	DOOR FRAME	METAL	INTACT	GRAY	6.18	10/15/18 14:11:40	NEGATIVE	0.57	0.12
24	EAST HS POOL	OTTOSEN	FIRST	POOL	FLOOR TILE	CERAMIC	INTACT	LT BROWN	5.46	10/15/18 14:13:09	NEGATIVE	0.21	0.13
25	EAST HS POOL	OTTOSEN	FIRST	POOL	WALL	CONCRETE	INTACT	YELLOW	5.3	10/15/18 14:15:16	NEGATIVE	0.21	0.13
26	EAST HS POOL	OTTOSEN	FIRST	POOL	WALL	DRYWALL	INTACT	YELLOW	5.38	10/15/18 14:15:59	NEGATIVE	0.21	0.13
27	EAST HS POOL	OTTOSEN	FIRST	POOL	WALL	DRYWALL	INTACT	YELLOW	5.43	10/15/18 14:16:30	NEGATIVE	0.22	0.13
28	EAST HS POOL	OTTOSEN	FIRST	POOL	WINDOW CASING	METAL	INTACT	BROWN	5.41	10/15/18 14:17:06	NEGATIVE	0.19	0.13
29	EAST HS POOL	OTTOSEN	FIRST	POOL	FLOOR TILE	CERAMIC	INTACT	BEIGE	5.67	10/15/18 14:17:56	NEGATIVE	0.22	0.13
30	EAST HS POOL	OTTOSEN	FIRST	POOL	FLOOR	CONCRETE	POOR	YELLOW	6.26	10/15/18 14:20:16	NEGATIVE	0.24	0.12
31	EAST HS POOL	OTTOSEN	FIRST	POOL VIEWING CORRIDOR	WALL	CMU	INTACT	YELLOW	5.33	10/15/18 14:22:39	NEGATIVE	0.25	0.13
32	EAST HS POOL	OTTOSEN	FIRST	SOUTH OFFICE	WALL	CMU	INTACT	YELLOW	5.5	10/15/18 14:23:03	NEGATIVE	0.15	0.13
33	EAST HS POOL	OTTOSEN	FIRST	SOUTH OFFICE	DOOR FRAME	METAL	INTACT	GRAY	5.54	10/15/18 14:23:38	NEGATIVE	0.14	0.13
34	EAST HS POOL	OTTOSEN	FIRST	SOUTH OFFICE	DOOR	METAL	INTACT	BLUE	5.38	10/15/18 14:24:07	NEGATIVE	0.2	0.13
35	EAST HS POOL	OTTOSEN	FIRST	CHEMICAL STORAGE	DOOR	METAL	INTACT	BLUE	5.09	10/15/18 14:33:13	NEGATIVE	0.14	0.13
36	EAST HS POOL	OTTOSEN	FIRST	CHEMICAL STORAGE	DOOR FRAME	METAL	INTACT	BEIGE	5.6	10/15/18 14:33:38	NEGATIVE	0.1	0.13
37	EAST HS POOL	OTTOSEN	FIRST	CHEMICAL STORAGE	WALL	DRYWALL	INTACT	OFF-WHITE	5.48	10/15/18 14:34:11	NEGATIVE	0.25	0.13
38	EAST HS POOL	OTTOSEN	FIRST	MECHANICAL ROOM	WALL	DRYWALL	INTACT	OFF-WHITE	5.08	10/15/18 14:34:46	NEGATIVE	0.17	0.13
39	EAST HS POOL	OTTOSEN	FIRST	MECHANICAL ROOM	FRAME	METAL	INTACT	BLUE	5.39	10/15/18 14:35:25	NEGATIVE	0.17	0.13
40	EAST HS POOL	OTTOSEN	FIRST	MECHANICAL ROOM	WALL	CMU	INTACT	OFF-WHITE	5.07	10/15/18 14:35:57	NEGATIVE	0.09	0.13
41	EAST HS POOL	OTTOSEN	FIRST	MECHANICAL ROOM	DOOR	METAL	INTACT	OFF-WHITE	5.46	10/15/18 14:36:35	NEGATIVE	0.05	0.13
42	EAST HS POOL	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.49	10/15/18 14:40:33	POSITIVE	1	0.07
43	EAST HS POOL	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.7	10/15/18 14:41:20	NEGATIVE	0.97	0.07
44	EAST HS POOL	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.46	10/15/18 14:42:08	POSITIVE	1.01	0.07

Table Heading Descriptions: See next page.

LEAD PAINT SCREENING SUMMARY

Duration: This is the nominal time in "source" seconds that each sample was analyzed.

LBP: Results are shown as positive (POS \geq 1.0 mg/cm²) or negative (NEG < 1.0 mg/cm²). Positive results are shown in bold print.

mg/cm²: This is the testing results produced by the Heuresis Pb200i instrument in milligrams of lead per square centimeter (mg/cm²). The EPA defines lead based paint as paint containing lead at 1.0 mg/cm² or greater. A negative number is a result of an internal computation made by the instrument and should be interpreted as zero. Even though paint may be termed negative (less than 1.0 mg/cm²) by EPA definition, disturbance of the paint may still be regulated by OSHA under 29 CFR 1926.62. Where lead is present at any level, appropriate engineering controls, work practices and personal protective equipment should be used until a negative exposure assessment can be determined. <LOD indicates that the lead present was less than the limits of detection of the instrument (very little or no lead present).

VOID: This indicates that the test was intentionally terminated by the operator due to operator error (e.g. - operator moved analyzer while testing).

Substrate: Where ceramic is shown as a substrate, lead content is typically from the glazing on the tile unless the tile is painted.

LEAD PAINT SCREENING SUMMARY

Heuresis Pb200i, Serial No. 1770

NO.	SITE	INSPECTOR	FLOOR	ROOM	COMPONENT	SUBSTRATE	CONDITION	COLOR	DURATION	TIME	RESULTS		
											LBP	mg/cm ²	+/- ERROR
1	EAST HS SPORTS COMPLEX	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.18	6/20/19 13:34:31	NEGATIVE	0.99	0.07
2	EAST HS SPORTS COMPLEX	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.32	6/20/19 13:35:47	POSITIVE	1.03	0.07
3	EAST HS SPORTS COMPLEX	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.34	6/20/19 13:37:04	POSITIVE	1.03	0.07
4	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	DOOR	METAL	INTACT	GRAY	3.13	6/20/19 13:40:24	NEGATIVE	0.1	0.17
5	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	DOOR FRAME	METAL	INTACT	GRAY	5.49	6/20/19 13:40:49	NEGATIVE	0.2	0.13
6	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	WALL	CONCRETE	FAIR	GRAY	2.42	6/20/19 13:41:31	POSITIVE	1.12	0.19
7	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	WALL	CONCRETE	FAIR	GRAY	5.26	6/20/19 13:41:44	POSITIVE	1.07	0.13
8	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	PARAPET CAP	METAL	FAIR	GRAY	5.23	6/20/19 13:42:57	NEGATIVE	0.19	0.13
9	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	PARAPET CAP	METAL	INTACT	BLUE	5.09	6/20/19 13:44:12	NEGATIVE	0.12	0.13
10	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	PARAPET CAP	METAL	INTACT	BLUE	6.34	6/20/19 13:44:35	NEGATIVE	0.03	0.12
11	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	WALL	METAL	INTACT	BLUE	5.32	6/20/19 13:45:10	NEGATIVE	0.22	0.13
12	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	WALL	CONCRETE	POOR	GRAY	5.27	6/20/19 13:46:05	NEGATIVE	0.6	0.13
13	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	WALL	CONCRETE	POOR	GRAY	5.17	6/20/19 13:47:19	POSITIVE	1.71	0.13
14	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	LOUVER	METAL	FAIR	GRAY	5.31	6/20/19 13:48:23	NEGATIVE	0.15	0.13
15	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	PARAPET CAP	METAL	FAIR	WHITE	5.34	6/20/19 13:49:35	NEGATIVE	0.33	0.13
16	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	WALL	CONCRETE	FAIR	BLUE	5.23	6/20/19 13:50:25	NEGATIVE	0.54	0.13
17	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	PARAPET CAP	METAL	INTACT	GRAY	5.41	6/20/19 13:51:43	NEGATIVE	0.32	0.13
18	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	PARAPET CAP	METAL	INTACT	BLUE	5.67	6/20/19 13:52:20	NEGATIVE	0.38	0.13
19	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	PARAPET CAP	METAL	INTACT	BLUE	5.28	6/20/19 13:53:44	NEGATIVE	0.33	0.13
20	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	LOUVER	METAL	FAIR	GRAY	5.21	6/20/19 13:55:12	NEGATIVE	0.54	0.13
21	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	WALL	CONCRETE	POOR	GRAY	7.14	6/20/19 13:56:18	POSITIVE	1.65	0.11
22	EAST HS SPORTS COMPLEX	OTTOSEN	ROOF	ROOF	WALL	CONCRETE	INTACT	WHITE	4.58	6/20/19 13:57:09	NEGATIVE	0.21	0.14
23	EAST HS SPORTS COMPLEX	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.34	6/20/19 13:59:10	POSITIVE	1.09	0.07
24	EAST HS SPORTS COMPLEX	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.32	6/20/19 14:00:27	POSITIVE	1.07	0.07
25	EAST HS SPORTS COMPLEX	OTTOSEN	VOID	VOID	VOID	VOID	VOID	VOID	VOID	6/20/19 14:01:44	VOID	VOID	VOID
26	EAST HS SPORTS COMPLEX	OTTOSEN	-	-	CALIBRATION CK	-	-	GREEN	20.31	6/20/19 14:02:59	POSITIVE	1.06	0.07

Table Heading Descriptions:

Duration: This is the nominal time in "source" seconds that each sample was analyzed.

LBP: Results are shown as positive (POS \geq 1.0 mg/cm²) or negative (NEG < 1.0 mg/cm²). Positive results are shown in bold print.

mg/cm²: This is the testing results produced by the Heuresis Pb200i instrument in milligrams of lead per square centimeter (mg/cm²). The EPA defines lead based paint as paint containing lead at 1.0 mg/cm² or greater. A negative number is a result of an internal computation made by the instrument and should be interpreted as zero. Even though paint may be termed negative (less than 1.0 mg/cm²) by EPA definition, disturbance of the paint may still be regulated by OSHA under 29 CFR 1926.62. Where lead is present at any level, appropriate engineering controls, work practices and personal protective equipment should be used until a negative exposure assessment can be determined. <LOD indicates that the lead present was less than the limits of detection of the instrument (very little or no lead present).

VOID: This indicates that the test was intentionally terminated by the operator due to operator error (e.g. - operator moved analyzer while testing).

Substrate:

LEAD BASED PAINT SCREENING

No.	SITE	INSPECTOR	FLOOR	ROOM	COMPONENT	SUBSTRATE	CONDITION	COLOR	Duration	Time	Depth Index	Results		
												LBP	mg/cm ²	+/- ERROR
1	MEARS MIDDLE SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	17.94	6/6/2012 11:44	1.1	Positive	1.1	0.1
2	MEARS MIDDLE SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	22.97	6/6/2012 11:45	1.08	Positive	1	0.1
3	MEARS MIDDLE SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	20.44	6/6/2012 11:47	2.64	Positive	1.1	0.1
4	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.2	6/6/2012 11:49	3.7	Negative	0.01	0.02
5	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	6.15	6/6/2012 11:50	2.17	Negative	0.01	0.02
6	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	9.61	6/6/2012 11:51	2.83	Negative	0.01	0.02
7	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.23	6/6/2012 11:52	2.46	Negative	0	0.02
8	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.22	6/6/2012 11:59	6.49	Negative	0.03	0.05
9	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.25	6/6/2012 12:00	1.86	Negative	0	0.02
10	MEARS MIDDLE SCHOOL	SCHWAN	VOID	VOID	VOID	VOID	VOID	VOID	VOID	6/6/2012 12:05	VOID	VOID	VOID	VOID
11	MEARS MIDDLE SCHOOL	SCHWAN	VOID	VOID	VOID	VOID	VOID	VOID	VOID	6/6/2012 12:05	VOID	VOID	VOID	VOID
12	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	5.2	6/6/2012 12:05	1.17	Negative	0	0.02
13	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	3.46	6/6/2012 12:06	1.61	Negative	0.01	0.02
14	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	7.53	6/6/2012 12:07	2.23	Negative	0.01	0.02
15	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	8.87	6/6/2012 12:11	1.17	Negative	0	0.02
16	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.21	6/6/2012 12:12	3.32	Negative	0.01	0.02
17	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.19	6/6/2012 12:13	3.96	Negative	0.01	0.03
18	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.22	6/6/2012 12:14	1.67	Negative	0	0.02
19	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.06	6/6/2012 12:15	1.51	Negative	0	0.02
20	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.79	6/6/2012 12:16	1	Negative	0	0.02
21	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.2	6/6/2012 12:19	4.06	Negative	0.01	0.02
22	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	9.6	6/6/2012 12:20	1	Negative	0	0.02
23	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	2.7	6/6/2012 12:20	1	Negative	0	0.02
24	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.21	6/6/2012 12:25	7.02	Negative	0.03	0.05
25	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	11.56	6/6/2012 12:25	3.29	Negative	0.01	0.02
26	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	7.72	6/6/2012 12:26	1.9	Negative	0	0.02
27	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.01	6/6/2012 12:27	3.1	Negative	0.01	0.02
28	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	3.85	6/6/2012 12:31	3.01	Negative	0.01	0.03
29	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	14.07	6/6/2012 12:32	1.78	Negative	0.01	0.02
30	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	7.9	6/6/2012 12:33	3.26	Negative	0.01	0.02
31	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	FAIR	WHITE	10.06	6/6/2012 12:34	1	Negative	0	0.02
32	MEARS MIDDLE SCHOOL	SCHWAN	FIRST	BATHROOM	WALL	CERAMIC	FAIR	WHITE	20.37	6/6/2012 12:53	4.22	Negative	0.02	0.02
33	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	PEELING	WHITE	10.02	6/6/2012 13:05	1.6	Negative	0.01	0.02
34	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	PEELING	WHITE	13.08	6/6/2012 13:06	6.23	Negative	0.02	0.04
35	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	PEELING	WHITE	10.02	6/6/2012 13:07	4.24	Negative	0.01	0.03
36	MEARS MIDDLE SCHOOL	SCHWAN	VOID	VOID	VOID	VOID	VOID	VOID	VOID	6/6/2012 13:08	VOID	VOID	VOID	VOID
37	MEARS MIDDLE SCHOOL	SCHWAN	ROOF		WALL	CONCRETE	PEELING	WHITE	3.85	6/6/2012 13:08	1.96	Negative	0.01	0.02
38	MEARS MIDDLE SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	20.81	6/6/2012 13:12	1.13	Positive	1.1	0.1
39	MEARS MIDDLE SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	20.39	6/6/2012 13:13	1.09	Positive	1.1	0.1
40	MEARS MIDDLE SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	20.4	6/6/2012 13:15	2.68	Positive	1.1	0.1
41	EAST HIGH SCHOOL	SCHWAN	-	-	SHUTTER CAL	-	-	-	170.95	6/6/2012 16:01	-	-	2.49	0
42	EAST HIGH SCHOOL	SCHWAN	VOID	VOID	VOID	VOID	VOID	VOID	VOID	6/6/2012 16:03	VOID	VOID	VOID	VOID
43	EAST HIGH SCHOOL	SCHWAN			CALIBRATION CK			RED	20.42	6/6/2012 16:04	1.08	Positive	1	0.1
44	EAST HIGH SCHOOL	SCHWAN	VOID	VOID	VOID	VOID	VOID	VOID	VOID	6/6/2012 16:04	VOID	VOID	VOID	VOID
45	EAST HIGH SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	10.41	6/6/2012 16:05	2.9	Positive	1.3	0.2

LEAD BASED PAINT SCREENING

No.	SITE	INSPECTOR	FLOOR	ROOM	COMPONENT	SUBSTRATE	CONDITION	COLOR	Duration	Time	Depth Index	Results		
												LBP	mg/cm ²	+/- ERROR
46	EAST HIGH SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	10.24	6/6/2012 16:07	5.88	Negative	-0.19	0.41
47	EAST HIGH SCHOOL	SCHWAN	ROOF		WALL	METAL	PEELING	BLUE	10.2	6/6/2012 16:09	3.34	Negative	0.09	0.05
48	EAST HIGH SCHOOL	SCHWAN	ROOF		WALL	METAL	PEELING	YELLOW	10.23	6/6/2012 16:10	5.18	Negative	-0.23	0.4
49	EAST HIGH SCHOOL	SCHWAN	ROOF		WALL	METAL	FAIR	YELLOW	9.41	6/6/2012 16:11	8.64	Negative	-0.25	0.41
50	EAST HIGH SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	10.2	6/6/2012 16:13	1.08	Positive	1.1	0.1
51	EAST HIGH SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	10.59	6/6/2012 16:14	1.09	Positive	1.1	0.1
52	EAST HIGH SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	20.41	6/6/2012 16:15	2.55	Positive	1.1	0.1

Table Heading Descriptions:

- Duration: This is the nominal time in seconds that each sample was analyzed.
- Depth Index: Indicates the relative depth of the lead. A Depth Index (DI) of less than 1.5 indicates lead very near the surface layer of paint. A DI between 1.5 and 4.0 indicates moderately covered lead. A DI greater than 4.0 indicates the lead paint is deeply buried beneath multiple layers of paint.
- LBP: Results are shown as positive (POS \geq 1.0 mg/cm²), inconclusive (INC) or negative (NEG < 1.0 mg/cm²). The results are based on the combined results of the K and L shell readings. L shell and K shell readings are not provided, but are available. Positive results are shown in bold print.
- mg/cm²: This is the testing results produced by the NITON XLi-300 instrument in milligrams of lead per square centimeter (mg/cm²). The EPA defines lead based paint as paint containing lead at 1.0 mg/cm² or greater. A negative number is a result of an internal computation made by the instrument and should be interpreted as zero. Even though paint may be termed negative (less than 1.0 mg/cm²) by EPA definition, disturbance of the paint may still be regulated by OSHA under 29 CFR 1926.62. Where lead is present at any level, appropriate engineering controls, work practices and personal protective equipment should be used until a negative exposure assessment can be determined. <LOD indicates that the lead present was less than the limits of detection of the instrument (very little or no lead present).
- VOID: This indicates that the test was intentionally terminated by the operator due to operator error (e.g. - operator moved analyzer while testing).
- Substrate: Where ceramic is shown as a substrate, lead content is typically from the glazing on the tile unless the tile is painted.

LEAD BASED PAINT SCREENING

No.	SITE	INSPECTOR	FLOOR	ROOM	COMPONENT	SUBSTRATE	CONDITION	COLOR	Duration	Time	Depth Index	Results		
												LBP	mg/cm ²	+/- ERROR
1	WEST HIGH SCHOOL	OTTOSEN	-	-	SHUTTER CAL	-	-	-	42.36	5/30/2012 9:36	-	-	7.52	0
2	WEST HIGH SCHOOL	OTTOSEN	-	-	CALIBRATION CK	-	-	RED	20.9	5/30/2012 9:37	1.09	Positive	1.1	0.1
3	WEST HIGH SCHOOL	OTTOSEN	-	-	CALIBRATION CK	-	-	RED	21.53	5/30/2012 9:37	1.07	Positive	1.1	0.1
4	WEST HIGH SCHOOL	OTTOSEN	-	-	CALIBRATION CK	-	-	RED	20.91	5/30/2012 9:38	2.49	Positive	1	0.1
5	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	DOOR TRIM	METAL	INTACT	GREEN	6.24	5/30/2012 9:43	2.3	Negative	0	0.02
6	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	DOOR	METAL	INTACT	GREEN	6.24	5/30/2012 9:44	1	Negative	0	0.02
7	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BEIGE	7.36	5/30/2012 9:46	6.3	Positive	1.9	0.4
8	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BEIGE	7.33	5/30/2012 9:46	9.23	Positive	2.4	1
9	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BEIGE	8.44	5/30/2012 9:46	6.98	Positive	2.1	0.4
10	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BROWN	11.32	5/30/2012 9:48	8.82	Positive	3	0.8
11	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BROWN	10.18	5/30/2012 9:48	10	Positive	2.7	0.8
12	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	DOOR TRIM	WOOD	INTACT	BEIGE	9.08	5/30/2012 9:50	2.77	Positive	6.4	0.9
13	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	DOOR	METAL	INTACT	BEIGE	6.76	5/30/2012 9:50	2.1	Negative	0.02	0.02
14	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BEIGE	8.46	5/30/2012 9:52	10	Positive	3.2	0.9
15	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BEIGE	7.35	5/30/2012 9:52	5.63	Positive	2	0.4
16	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BEIGE	6.79	5/30/2012 9:54	4.27	Positive	1.9	0.3
17	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BLACK	6.23	5/30/2012 9:56	1.76	Positive	2.1	0.2
18	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BROWN	6.82	5/30/2012 9:56	1.6	Positive	2.5	0.2
19	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	WOOD	INTACT	BEIGE	10.16	5/30/2012 9:58	5.67	Positive	8.6	0.9
20	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BEIGE	6.79	5/30/2012 10:00	5.15	Positive	3.1	0.5
21	WEST HIGH SCHOOL	OTTOSEN	VOID	VOID	VOID	VOID	VOID	VOID	VOID	5/30/2012 10:02	VOID	VOID	VOID	VOID
22	WEST HIGH SCHOOL	OTTOSEN	VOID	VOID	VOID	VOID	VOID	VOID	VOID	5/30/2012 10:03	VOID	VOID	VOID	VOID
23	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BROWN	6.22	5/30/2012 10:04	2.98	Positive	2.2	0.3
24	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	DOOR TRIM	WOOD	INTACT	BEIGE	8.52	5/30/2012 10:04	2.29	Positive	5.5	0.8
25	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	DOOR	METAL	INTACT	BEIGE	7.34	5/30/2012 10:05	1.59	Negative	0.02	0.02
26	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	BEIGE	7.92	5/30/2012 10:10	3.68	Positive	1.7	0.2
27	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	COLUMN	CONCRETE	INTACT	BEIGE	10.17	5/30/2012 10:11	1.7	Negative	0.01	0.02
28	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	COLUMN	CONCRETE	INTACT	BEIGE	6.77	5/30/2012 10:11	3.79	Negative	0.04	0.04
29	WEST HIGH SCHOOL	OTTOSEN	FIRST	EXTERIOR	HAND RAIL	METAL	FAIR	BEIGE	6.78	5/30/2012 10:12	1	Negative	0	0.02
30	WEST HIGH SCHOOL	OTTOSEN	-	-	CALIBRATION CK	-	-	RED	20.92	5/30/2012 10:19	1.1	Positive	1.1	0.1
31	WEST HIGH SCHOOL	OTTOSEN	-	-	CALIBRATION CK	-	-	RED	20.87	5/30/2012 10:19	1.09	Positive	1.1	0.1
32	WEST HIGH SCHOOL	OTTOSEN	-	-	CALIBRATION CK	-	-	RED	20.95	5/30/2012 10:20	2.46	Positive	1	0.1
33	WEST HIGH SCHOOL	OTTOSEN	-	-	SHUTTER CAL	-	-	-	44.13	5/30/2012 14:38	-	-	8.02	0
34	WEST HIGH SCHOOL	OTTOSEN	-	-	CALIBRATION CK	-	-	RED	10.73	5/30/2012 14:39	1.13	Positive	1.1	0.1
35	WEST HIGH SCHOOL	OTTOSEN	-	-	CALIBRATION CK	-	-	RED	27.19	5/30/2012 14:40	1.09	Positive	1.1	0.1
36	WEST HIGH SCHOOL	OTTOSEN	-	-	CALIBRATION CK	-	-	RED	11.36	5/30/2012 14:40	2.72	Positive	1.2	0.1
37	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	COLUMN	PLASTER	INTACT	GRAY	5.65	5/30/2012 14:47	2.39	Negative	0	0.02
38	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	INTACT	WHITE	6.21	5/30/2012 14:48	1	Negative	0	0.02
39	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	INTACT	GRAY	10.76	5/30/2012 14:49	1	Negative	0	0.02
40	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	COLUMN	PLASTER	INTACT	SILVER	10.74	5/30/2012 14:51	1	Negative	0	0.02
41	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	INTACT	RED	10.18	5/30/2012 15:02	2.77	Negative	-0.06	0.3
42	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	METAL	INTACT	BEIGE	10.18	5/30/2012 15:04	1	Negative	0	0.02
43	EAST HIGH SCHOOL	SCHWAN	VOID	VOID	VOID	VOID	VOID	VOID	VOID	5/30/2012 15:05	VOID	VOID	VOID	VOID
44	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	INTACT	WHITE	10.76	5/30/2012 15:05	1	Negative	0	0.02
45	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	COLUMN	PLASTER	INTACT	GRAY	10.75	5/30/2012 15:06	3.16	Negative	0.13	0.38
46	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	INTACT	GRAY	10.74	5/30/2012 15:08	2.92	Negative	0	0.02
47	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	INTACT	YELLOW	10.78	5/30/2012 15:12	2.33	Negative	0.04	0.02
48	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	CONCRETE	INTACT	YELLOW	25.94	5/30/2012 15:14	3.06	Positive	1.5	0.4
49	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	INTACT	YELLOW	29.48	5/30/2012 15:17	2.53	Negative	0.05	0.02
50	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	METAL	INTACT	YELLOW	11.32	5/30/2012 15:19	3.89	Negative	-0.05	0.43
51	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	METAL	INTACT	BLUE	21.45	5/30/2012 15:21	4.94	Negative	0.8	0.1
52	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	POST	METAL	INTACT	BLUE	10.77	5/30/2012 15:23	1.95	Negative	0.06	0.02
53	EAST HIGH SCHOOL	SCHWAN	VOID	VOID	VOID	VOID	VOID	VOID	VOID	5/30/2012 15:23	VOID	VOID	VOID	VOID
54	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	METAL	INTACT	BLUE	10.19	5/30/2012 15:24	3.51	Negative	0.8	0.1
55	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	DOORCASING	METAL	INTACT	BLUE	10.79	5/30/2012 15:26	1	Negative	0	0.02
56	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	METAL	PEELING	YELLOW	10.79	5/30/2012 15:30	4.37	Negative	0.08	0.05
57	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	METAL	FAIR	BLUE	23.12	5/30/2012 15:33	2.77	Positive	1.9	0.4

LEAD BASED PAINT SCREENING

No.	SITE	INSPECTOR	FLOOR	ROOM	COMPONENT	SUBSTRATE	CONDITION	COLOR	Duration	Time	Depth Index	Results		
												LBP	mg/cm ²	+/- ERROR
58	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	METAL	FAIR	BLUE	18.03	5/30/2012 15:34	1.81	Negative	0.01	0.02
59	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	POOR	BLUE	17.45	5/30/2012 15:36	8.42	Positive	2.1	0.4
60	EAST HIGH SCHOOL	SCHWAN	VOID	VOID	VOID	VOID	VOID	VOID	VOID	5/30/2012 15:38	VOID	VOID	VOID	VOID
61	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	FAIR	BLUE	15.26	5/30/2012 15:39	3.5	Positive	1.9	0.5
62	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	FAIR	BLUE	14.61	5/30/2012 15:41	1.99	Negative	0.01	0.02
63	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	CONCRETE	FAIR	YELLOW	21.99	5/30/2012 15:43	2.09	Negative	0.02	0.02
64	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	METAL	FAIR	YELLOW	9.58	5/30/2012 15:44	5.49	Negative	0.06	0.05
65	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	METAL	FAIR	YELLOW	10.76	5/30/2012 15:46	4.03	Negative	0.1	0.05
66	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	FAIR	YELLOW	11.9	5/30/2012 15:49	3.99	Negative	0.03	0.03
67	EAST HIGH SCHOOL	SCHWAN	VOID	VOID	VOID	VOID	VOID	VOID	VOID	5/30/2012 15:50	VOID	VOID	VOID	VOID
68	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	FAIR	BLUE	26.61	5/30/2012 15:51	1.83	Negative	0.6	0.1
69	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	FAIR	YELLOW	14.73	5/30/2012 15:53	4.38	Negative	0.02	0.02
70	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WINDOW CASING	CONCRETE	FAIR	RED	10.74	5/30/2012 15:55	1	Negative	0	0.02
71	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	CONCRETE	FAIR	BLUE	22.6	5/30/2012 15:57	2.5	Positive	1.7	0.4
72	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	CONCRETE	FAIR	BLUE	18.64	5/30/2012 15:58	3.29	Positive	1.6	0.5
73	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	CONCRETE	FAIR	RED	11.33	5/30/2012 15:59	2.47	Positive	2.1	0.6
74	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	COLUMN	CONCRETE	FAIR	BLUE	25.48	5/30/2012 16:00	1.51	Positive	1.4	0.4
75	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	COLUMN	CONCRETE	FAIR	BLUE	31.62	5/30/2012 16:01	2.16	Negative	0.4	0.1
76	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	COLUMN	CONCRETE	FAIR	BLUE	30.57	5/30/2012 16:02	1.49	Negative	0.25	0.02
77	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	COLUMN	CONCRETE	FAIR	BLUE	26.57	5/30/2012 16:03	2.07	Negative	0.4	0.1
78	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	COLUMN	CONCRETE	FAIR	BLUE	19.23	5/30/2012 16:04	3.33	Negative	0.2	0.04
79	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	POOR	YELLOW	10.76	5/30/2012 16:06	1.62	Negative	0.01	0.02
80	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	COLUMN	PLASTER	POOR	BLUE	25.36	5/30/2012 16:08	1.75	Negative	0.5	0.1
81	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	PLASTER	INTACT	YELLOW	11.25	5/30/2012 16:12	4.31	Negative	0.03	0.03
82	EAST HIGH SCHOOL	SCHWAN	FIRST	EXTERIOR	WALL	METAL	INTACT	YELLOW	11.36	5/30/2012 16:13	3.39	Negative	0.4	0.1
83	EAST HIGH SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	13.6	5/30/2012 16:23	1.1	Positive	1.1	0.1
84	EAST HIGH SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	11.92	5/30/2012 16:24	1.13	Positive	1.1	0.1
85	EAST HIGH SCHOOL	SCHWAN	-	-	CALIBRATION CK	-	-	RED	8.49	5/30/2012 16:24	2.86	Positive	1.2	0.2

Table Heading Descriptions:

Duration: This is the nominal time in seconds that each sample was analyzed.

Depth Index: Indicates the relative depth of the lead. A Depth Index (DI) of less than 1.5 indicates lead very near the surface layer of paint. A DI between 1.5 and 4.0 indicates moderately covered lead. A DI greater than 4.0 indicates the lead paint is deeply buried beneath multiple layers of paint.

LBP: Results are shown as positive (POS \geq 1.0 mg/cm²), inconclusive (INC) or negative (NEG < 1.0 mg/cm²). The results are based on the combined results of the K and L shell readings. L shell and K shell readings are not provided, but are available. Positive results are shown in bold print.

mg/cm²: This is the testing results produced by the NITON XLP-300A (Serial No. 26950) instrument in milligrams of lead per square centimeter (mg/cm²). The EPA defines lead based paint as paint containing lead at 1.0 mg/cm² or greater. A negative number is a result of an internal computation made by the instrument and should be interpreted as zero. Even though paint may be termed negative (less than 1.0 mg/cm²) by EPA definition, disturbance of the paint may still be regulated by OSHA under 29 CFR 1926.62. Where lead is present at any level, appropriate engineering controls, work practices and personal protective equipment should be used until a negative exposure assessment can be determined. <LOD indicates that the lead present was less than the limits of detection of the instrument (very little or no lead present).

VOID: This indicates that the test was intentionally terminated by the operator due to operator error (e.g. - operator moved analyzer while testing).

Substrate: Where ceramic is shown as a substrate, lead content is typically from the glazing on the tile unless the tile is painted.

LEAD BASED PAINT SCREENING SUMMARY

NO.	SITE	INSPECTOR	FLOOR	ROOM	COMPONENT	SUBSTRATE	COLOR	CONDITION	Duration	Time	Depth Index	Results		
												LBP	mg/cm ²	+/- Error
37	East HS SPED	BONNEY	-	-	SHUTTER CAL	-	-	-	33.89	7/3/2007 10:17			14.19	0
38	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	7/3/2007 10:21	VOID	VOID	VOID	VOID
39	East HS SPED	BONNEY	-	-	CALIBRATION CK	-	-	-	28.3	7/3/2007 10:23	1.07	Positive	1	0.1
40	East HS SPED	BONNEY	-	-	CALIBRATION CK	-	-	-	21.52	7/3/2007 10:24	1.14	Positive	1.1	0.1
41	East HS SPED	BONNEY	-	-	CALIBRATION CK	-	-	-	4.33	7/3/2007 10:24	1.09	Null	1.1	0.2
42	East HS SPED	BONNEY	-	-	CALIBRATION CK	-	-	-	25.83	7/3/2007 10:24	1.11	Positive	1.1	0.1
43	East HS SPED	BONNEY	FIRST	14	WALL	CONCRETE	BEIGE	INTACT	21.43	7/3/2007 10:26	1.36	Negative	0	0.02
44	East HS SPED	BONNEY	FIRST	14	RADIATOR	METAL	BEIGE	INTACT	20.26	7/3/2007 10:27	1.52	Negative	0.04	0.02
45	East HS SPED	BONNEY	FIRST	14	WALL	WOOD	BROWN	INTACT	21.48	7/3/2007 10:29	1.14	Negative	0.16	0.02
46	East HS SPED	BONNEY	FIRST	14	WALL	CONCRETE	BEIGE	INTACT	20.81	7/3/2007 10:30	1	Negative	0	0.02
47	East HS SPED	BONNEY	FIRST	14	DOOR TRIM	METAL	BLUE	INTACT	20.89	7/3/2007 10:31	1.85	Negative	0.9	0.1
48	East HS SPED	BONNEY	FIRST	14	DOOR	WOOD	VARNISH	INTACT	20.78	7/3/2007 10:32	1.5	Negative	0.02	0.02
49	East HS SPED	BONNEY	FIRST	37C	DOOR	WOOD	VARNISH	INTACT	20.92	7/3/2007 10:34	1.47	Negative	0	0.02
50	East HS SPED	BONNEY	FIRST	37C	DOOR TRIM	WOOD	VARNISH	INTACT	20.88	7/3/2007 10:34	2.88	Negative	0	0.02
51	East HS SPED	BONNEY	FIRST	37C	WALL	DRYWALL	BEIGE	INTACT	20.84	7/3/2007 10:35	2.09	Negative	0	0.02
52	East HS SPED	BONNEY	FIRST	Library	WALL	DRYWALL	BEIGE	INTACT	20.22	7/3/2007 10:36	1.03	Negative	0	0.02
53	East HS SPED	BONNEY	FIRST	Library	BASEBOARD	METAL	BEIGE	INTACT	20.89	7/3/2007 10:37	1.86	Negative	0.03	0.02
54	East HS SPED	BONNEY	FIRST	SER 1	DOOR TRIM	METAL	RED	INTACT	1.83	7/3/2007 10:38	2.24	Null	0.8	0.4
55	East HS SPED	BONNEY	FIRST	SER 2	DOOR TRIM	METAL	RED	INTACT	22.03	7/3/2007 10:39	2.52	Positive	1	0.1
56	East HS SPED	BONNEY	FIRST	SER 2	WALL	CERAMIC	RED	INTACT	20.85	7/3/2007 10:41	1.2	Negative	0	0.02
57	East HS SPED	BONNEY	FIRST	SER 2	FLOOR	CERAMIC	TAN	INTACT	20.82	7/3/2007 10:42	1.96	Negative	0.02	0.02
58	East HS SPED	BONNEY	-	-	CALIBRATION CK	-	-	-	26.98	7/3/2007 10:44	1.13	Positive	1.1	0.1
59	East HS SPED	BONNEY	-	-	CALIBRATION CK	-	-	-	20.89	7/3/2007 10:44	1.1	Positive	1.1	0.1
60	East HS SPED	BONNEY	-	-	CALIBRATION CK	-	-	-	20.9	7/3/2007 10:45	1.12	Positive	1.1	0.1

Table Heading Descriptions:

- Duration: This is the nominal time in seconds that each sample was analyzed.
- Depth Index: Indicates the relative depth of the lead. A Depth Index (DI) of less than 1.5 indicates lead very near the surface layer of paint. A DI between 1.5 and 4.0 indicates moderately covered lead. A DI greater than 4.0 indicates the lead paint is deeply buried beneath multiple layers of paint.
- LBP: Results are shown as positive (POS \geq 1.0 mg/cm²), inconclusive (INC) or negative (NEG $<$ 1.0 mg/cm²). The results are based on the combined results of the K and L shell readings. L shell and K shell readings are not provided, but are available. Positive results are shown in bold print.
- mg/cm²: This is the testing results produced by the NITON XLI-300 instrument in milligrams of lead per square centimeter (mg/cm²). The EPA defines lead based paint as paint containing lead at 1.0 mg/cm² or greater. A negative number is a result of an internal computation made by the instrument and should be interpreted as zero. Even though paint may be termed negative (less than 1.0 mg/cm²) by EPA definition, disturbance of the paint may still be regulated by OSHA under 29 CFR 1926.62. Where lead is present at any level, appropriate engineering controls, work practices and personal protective equipment should be used until a negative exposure assessment can be determined. <LOD indicates that the lead present was less than the limits of detection of the instrument (very little or no lead present).
- VOID: This indicates that the test was intentionally terminated by the operator due to operator error (e.g. - operator moved analyzer while testing).
- Substrate: Where ceramic is shown as a substrate, lead content is typically from the glazing on the tile unless the tile is painted.

Lead Paint Screening
East High School Renewal, Phase 4A & 4B

No	Site	Inspect	Floor	Room	Structure	Substrate	Feature	Condition	Color	Ssec	Date/Time	Depth Index	Results			
													LBP	mg/cm2	"+/-"	
1	East HS	French		Shutter Cal	1					37.9	11/7/03 17:05	0 ...	NA			
2	East HS	French		Calibrate		1.6 Buried				20.5	11/7/03 17:06	2.6 POS	1.66	0.38		
3	East HS	French		Calibrate		1.0 Buried				30.7	11/7/03 17:07	2.7 POS	1.2	0.26		
4	East HS	French		Calibrate		0.3 Buried				21	11/7/03 17:08	1.8 NEG	0.2	0.11		
5	East HS	French		Calibrate		3.5 Surface				21.8	11/7/03 17:08	1.2 POS	3.92	0.41		
6	East HS	French		Calibrate		1.0 Surface				28.4	11/7/03 17:09	1.1 POS	1.07	0.14		
7	East HS	French	1 Room	86	Wall	Plaster		Intact	Beige	25.1	11/7/03 17:13	1 NEG	0	0.01		
8	East HS	French	1 Room	86	Wall	Concrete		Intact	Beige	25.4	11/7/03 17:14	1 NEG	0	0.01		
9	East HS	French	1 Room	86	Wall	Drywall		Intact	Beige	20.7	11/7/03 17:15	1 NEG	0	0.05		
10	East HS	French	1 Room	86	Wall	CMU		Intact	Beige	38.3	11/7/03 17:16	1 NEG	0	0.03		
11	East HS	French	1 Room	86	Window	Metal	Casing	Intact	Blue	24.7	11/7/03 17:18	1.2 NEG	0.05	0.04		
12	East HS	French	1 Room	86	Window	Metal	Casing	Intact	Blue	24.1	11/7/03 17:19	1 NEG	0.08	0.04		
13	East HS	French	1 Room	86	Door	Metal	Casing	Intact	Blue	22.6	11/7/03 17:20	1.4 NEG	0.12	0.07		
14	East HS	French	1 Room	86	Wall	Hard Bd Panel		Intact	Beige	21.9	11/7/03 17:21	1 NEG	0	0.01		
15	East HS	French	1 Room	86	Wall	Ceiling Tile		Intact	Beige	20.5	11/7/03 17:23	1 NEG	0	0.01		
16	East HS	French	1 Room	85	Wall	Metal	Return Grille	Intact	Beige	18.9	11/7/03 17:25	2 VOID	VOID	VOID		
17	East HS	French	1 Room	85	Wall	Metal	Return Grille	Intact	Beige	21.3	11/7/03 17:26	1 NEG	0	0.01		
18	East HS	French	1 Room	85	Wall	CMU		Intact	Beige	20.7	11/7/03 17:27	1 NEG	0	0.01		
19	East HS	French	1 Room	85	Wall	Concrete		Intact	Beige	23.1	11/7/03 17:28	1 NEG	0	0.05		
20	East HS	French	1 Room	85	Wall	Hard Bd Panel		Intact	Beige	21.8	11/7/03 17:29	1.9 NEG	0	0.02		
21	East HS	French	1 Room	85	Door	Wood	Door	Intact	Varnish	21	11/7/03 17:30	1 NEG	0	0.01		
22	East HS	French	1 Room	85	Door	Metal	Casing	Intact	Blue	20.2	11/7/03 17:32	1.4 NEG	0.13	0.08		
23	East HS	French	1 Room	85	Cabinet	Metal	Door	Intact	Beige	21.5	11/7/03 17:33	1 NEG	0	0.01		
24	East HS	French	1 Room	85	Wall	Hard Bd Panel		Intact	Beige	21.6	11/7/03 17:34	2.1 NEG	0.3	0.14		
25	East HS	French	1 Room	85	Window	Metal	Casing	Intact	Blue	22.8	11/7/03 17:35	1.2 NEG	0.08	0.05		
26	East HS	French	1 Hall	102	Door Opng	Metal	Casing	Intact	White	20.6	11/7/03 17:37	2.3 NEG	0.54	0.19		
27	East HS	French	1 Hall	102	CUH	Metal	Heater Face	Intact	White	23.5	11/7/03 17:39	1.9 NEG	0.01	0.11		
28	East HS	French	1 Exterior		Wall	Concrete	Textured	Intact	Blue	62.1	11/7/03 17:40	1.9 POS	1.4	0.63		
29	East HS	French	1 Exterior		Wall	Wood	Textured	Intact	Blue	42.4	11/7/03 17:42	1.8 NEG	0.25	0.08		
30	East HS	French	1 Room	84d	Wall	Hard Bd Panel		Intact	Beige	21.4	11/7/03 17:45	1 NEG	0	0.01		
31	East HS	French	1 Room	84d	Door	Metal	Door	Intact	Brown	22.6	11/7/03 17:45	2.5 NEG	0.03	0.13		
32	East HS	French	1 Hall	101	Wall	Concrete		Intact	White	20.8	11/7/03 17:47	2.2 NEG	0.04	0.11		
33	East HS	French	1 Room	91a	Tank	Metal	Expans Tank	Intact	Red	21.4	11/7/03 17:50	1.7 NEG	0.07	0.07		
34	East HS	French	1 Room	91a	Box	Metal	Elec Panel	Intact	Brown	21.7	11/7/03 17:54	1 NEG	0.04	0.03		
35	East HS	French	1 Room	91f	Fan	Metal	Fan Housing	Intact	Grey	21.3	11/7/03 17:57	1.3 NEG	0.04	0.05		
36	East HS	French	1 Hall	100	Door to 91	Metal	Door	Intact	Blue	23.2	11/7/03 18:01	1.1 NEG	0.06	0.04		
37	East HS	French	1 Ceiling above	100	Beam	Metal	OWJ	Intact	Red	20	11/7/03 18:03	1 NEG	0.04	0.04		
38	East HS	French	1 Ceiling above	100	Ceiling	Metal	I Beam	Intact	Red	24	11/7/03 18:05	1 NEG	0.04	0.04		
39	East HS	French	1 Hall	100	Door to 83	Wood	Door	Intact	Varnish	23.5	11/7/03 18:09	1.1 NEG	0	0.01		
40	East HS	French	1 Hall	100	Door to 83d	Metal	Casing	Intact	Blue	21.2	11/7/03 18:11	1.4 NEG	0.01	0.1		
41	East HS	French	1 Room	84	Wall	Vinyl Gyp Board		Intact	Beige	27.5	11/7/03 18:13	1 NEG	0	0.01		
42	East HS	French	1 Room	84	Window	Metal	Casing	Intact	Blue	22	11/7/03 18:14	1.9 NEG	0.04	0.07		
43	East HS	French	1 Room	84a	Wall	Hard Bd Panel		Intact	Beige	21.3	11/7/03 18:16	1 NEG	0	0.01		

**Lead Paint Screening
East High School Renewal, Phase 4A & 4B**

No	Site	Inspect	Floor	Room	Structure	Substrate	Feature	Condition	Color	Ssec	Date/Time	Depth Index	Results		
													LBP	mg/cm ²	" +/- "
44	East HS	French	1	Room 83a	Wall	CMU		Intact	Beige	36.4	11/7/03 18:18	1	NEG	0	0.03
45	East HS	French	1	Room 83a	Wall	Drywall		Intact	Beige	23.1	11/7/03 18:21	1	NEG	0	0.05
46	East HS	French	1	Southeast Street	Wall	CMU		Intact	Beige	20.9	11/7/03 18:24	1	NEG	0	0.01
47	East HS	French	1	Southeast Street	Locker	Metal	Door Out	Intact	Blue	21.3	11/7/03 18:25	2.4	NEG	0.06	0.1
48	East HS	French	1	Southeast Street	Baseboard	Rubber	Cove	Intact	Grey	14.5	11/7/03 18:27	1	NEG	0	0.01
49	East HS	French	1	Southeast Street	Door to 1	Metal	Casing	Intact	Red	20.4	11/7/03 18:27	1.4	NEG	0.26	0.1
50	East HS	French	1	Southeast Street	Door to 1	Wood	Door	Intact	Varnish	21.9	11/7/03 18:28	1	NEG	0	0.06
51	East HS	French	1	Room 3	Wall	CMU		Intact	Beige	20.9	11/7/03 18:30	1	NEG	0	0.01
52	East HS	French	1	Room 3	Baseboard	Rubber	Cove	Intact	Black	21.3	11/7/03 18:31	1	NEG	0	0.01
53	East HS	French	1	Room 3	Chalkboard	Hard Bd Panel		Intact	Brown	18.7	11/7/03 18:33	1	NEG	0.23	0.06
54	East HS	French	1	Room 3	Wall	Metal panel	Infill	Intact	Beige	23.5	11/7/03 18:35	1.8	NEG	0.07	0.07
55	East HS	French	1	Southeast Street	Wall	CMU	Red stripe	Intact	Red	27.8	11/7/03 18:36	1	NEG	0	0.01
56	East HS	French	1	Southeast Street	Wall	CMU	Blue stripe	Intact	Blue	16	11/7/03 18:37	1	INCOM	0	0.01
57	East HS	French		Calibrate	1.6 Surface					21.8	11/7/03 18:39	1.1	POS	1.59	0.2
58	East HS	French		Calibrate	0 Surface					21.3	11/7/03 18:39	1	NEG	0	0.01
59	East HS	French		Calibrate	0.3 Surface					28.7	11/7/03 18:40	1	NEG	0.27	0.06
60	East HS	French		Calibrate	0.3 Buried					64.2	11/7/03 18:41	1.7	NEG	0.19	0.06
61	East HS	French		Calibrate	3.5 Buried					27.9	11/7/03 18:43	2.5	POS	3.07	0.47
62	East HS	French		Calibrate	1.6 Buried					22.3	11/7/03 18:43	2.4	POS	1.66	0.35

Table Heading Descriptions:

Ssec: This is the nominal time in seconds that each sample was analyzed.

Depth Index: Indicates the relative depth of the lead. A Depth Index greater than 4.0 indicates the lead paint is deeply buried beneath multiple layers of paint.

LBP: Results are shown as positive (POS ≥ 1.0 mg/cm²), inconclusive (INC) or negative (NEG < 1.0 mg/cm²) and K shell readings are not provided. Positive results are also in bold print.

mg/cm²: This is the testing results produced by the NITON XL-309 instrument in milligrams of lead per square centimeter (mg/cm²). The EPA defines lead based paint as paint containing lead at 1.0 mg/cm² or greater. A negative number is a result of an internal computation made by the instrument and should be interpreted as zero. Even though paint may be termed negative (less than 1.0 mg/cm) by EPA definition, disturbance of the paint may still be regulated by OSHA under 29 CFR 1926.62. Where lead is present at any level, appropriate engineering controls, work practices and personal protective equipment should be used until a negative exposure assessment can be determined.

VOID: This indicates that the test was intentionally terminated by the operator due to operator error (e.g. - operator moved analyzer while testing).

**Lead Paint Screening
East High School Renewal, Phase 2 & 3**

No	Site	Inspect	Floor	Room	Structure	Substrate	Feature	Condit	Color	Ssec	Date/Time	Depth Index	Results				
													LBP	mg/cm2	"+/-"		
1	East HS	French		Shutter Cal 1						35.5	2/18/02 9:31	0	...	NA			
2	East HS	French		Calibration	1.6 surface					19.8	2/18/02 9:31	1.1	POS	1.79	0.20		
3	East HS	French		Calibration	1.0 surface					77.8	2/18/02 9:31	1.1	POS	1.15	0.07		
4	East HS	French		Calibration	0.3 surface					15.6	2/18/02 9:34	1	NEG	0.28	0.05		
5	East HS	French		Calibration	3.5 surface					59.9	2/18/02 9:34	1.3	POS	4.26	0.23		
6	East HS	French		Calibration	1.6 buried					65.3	2/18/02 9:36	2.5	POS	1.89	0.19		
7	East HS	French		Calibration	1.0 buried					32.3	2/18/02 9:38	2.4	POS	1.13	0.20		
8	East HS	French	1	IMC, Room 184	Wall	CAB		Intact	White	44.5	2/18/02 9:44	1	NEG	0.00	0.06		
9	East HS	French	1	IMC, Room 184	Wall	Drywall		Intact	White	42.3	2/18/02 9:46	1.1	NEG	0.00	0.06		
10	East HS	French	1	IMC, Room 184	Door to BPO	Metal	Jamb	Intact	Blue	36.9	2/18/02 9:53	1.3	NEG	0.07	0.03		
11	East HS	French								7.2	2/18/02 9:54	1	VOID	VOID	VOID		
12	East HS	French	1	IMC, Room 184	Door to BPO	Wood	Door	Intact	Varnish	43.5	2/18/02 9:54	1	NEG	0.00	0.01		
13	East HS	French	1	IMC, Room 184	Column	Concrete		Intact	White	42.0	2/18/02 9:57	1	NEG	0.00	0.04		
14	East HS	French	1	Corridor 1000	Door to Fan Rm 4	Metal		Intact	Red	42.0	2/18/02 10:01	1.5	NEG	0.06	0.03		
15	East HS	French	1	Corridor 1000	Door to Fan Rm 4	Metal	Jamb	Intact	Red	27.6	2/18/02 10:03	2	NEG	0.70	0.14		
16	East HS	French	1	Corridor 1000	Locker #2746	Metal	Door Out	Intact	Blue	23.8	2/18/02 10:05	4.3	NEG	0.09	0.15		
17	East HS	French	1	Girls Restroom	Wall	Ceramic	1"x2"	Intact	White	42.1	2/18/02 10:07	3.8	NEG	0.02	0.10		
18	East HS	French	1	Girls Restroom	Wall	Ceramic	1"x2"	Intact	Pink	22.5	2/18/02 10:08	6.1	NEG	0.05	0.13		
19	East HS	French	1	Girls Restroom	Floor	Ceramic	1"x1"	Intact	Grey	41.9	2/18/02 10:10	5.6	NEG	0.04	0.11		
20	East HS	French	1	Girls Restroom	Wall	Concrete	CMU	Intact	White	44.4	2/18/02 10:12	2	NEG	0.00	0.05		
21	East HS	French	1	Corridor 1000	Door to Rm 1	Metal	Jamb	Intact	Red	23.4	2/18/02 10:14	2.4	NEG	0.68	0.17		
22	East HS	French	1	Room 1	Enclosure	Metal	Radiator	Intact	White	42.3	2/18/02 10:16	1.8	NEG	0.06	0.04		
23	East HS	French	1	Room 1	Wall	Concrete	CMU	Intact	White	49.0	2/18/02 10:17	1	NEG	0.00	0.05		
24	East HS	French	1	Nurse First Aid	Wall	Concrete	CMU	Intact	White	42.2	2/18/02 10:22	1	NEG	0.00	0.01		
25	East HS	French								14.0	2/18/02 10:23	1.2	VOID	VOID	VOID		
26	East HS	French	1	Nurse Rm 186	Door to 186B	Metal	Jamb	Intact	Blue	40.1	2/18/02 10:24	1	NEG	0.03	0.01		
27	East HS	French	1	Corridor 2600	Door to 184A	Wood	Door	Intact	Varnish	43.9	2/18/02 10:27	1	NEG	0.00	0.01		
28	East HS	French	1	Fan Rm Access	Stairs	Metal	Stringer	Intact	Red	41.5	2/18/02 10:30	1.1	NEG	0.07	0.03		
29	East HS	French	2	Fan Rm Upper Stair	Pipe Solder Fitting	Metal	Roof Drain	Intact		8.9	2/18/02 10:34	1.2	POS	5.95	1.47		
30	East HS	French	1	Corridor 3000	Wall	Concrete	CMU	Intact	Red	42.2	2/18/02 10:37	1	NEG	0.00	0.01		
31	East HS	French	1	Corridor 3000	Wall	Metal	Insul Window Panel	Intact	White	51.7	2/18/02 10:39	1.7	NEG	0.01	0.04		
32	East HS	French	1	Corridor 3000	Wall	Concrete	Columns	Intact	White	42.1	2/18/02 10:41	1	NEG	0.00	0.01		
33	East HS	French	1	Corridor 3000	Door to E Projector	Metal	Jamb	Intact	Red	34.5	2/18/02 10:43	1.9	NEG	0.20	0.07		
34	East HS	French	2	Projection Booth	Wall	Plaster	Bromine Interference	Intact	Blue	58.3	2/18/02 10:47	8.6	NEG	-0.22	0.43	Bromine Interference	
35	East HS	French	2	Projection Booth	Wall	Plaster	Bromine Interference	Intact	Blue	62.9	2/18/02 10:49	4.7	NEG	0.04	0.13	Bromine Interference	
36	East HS	French	2	Projection Booth	Wall	Concrete	CMU	Intact	Blue	60.4	2/18/02 10:51	2.4	NEG	0.02	0.05		
37	East HS	French	2	Projection Booth	Wall	Plaster	Bromine Interference	Intact	Blue	42.1	2/18/02 10:54	1	NEG	0.00	0.03	Bromine Interference	
38	East HS	French	1	Boys Restroom	Floor	Ceramic	1"x1"	Intact	White	59.9	2/18/02 11:11	10	NEG	0.30	0.56		
39	East HS	French	1	Stage	Wall	Concrete	Back wall	Intact	Blue	42.3	2/18/02 11:19	1	NEG	0.00	0.01		
40	East HS	French		Calibrate	1.0 buried					40.9	2/18/02 11:22	2.3	POS	1.04	0.16		
41	East HS	French		Calibrate	1.6 buried					40.4	2/18/02 11:23	2.5	POS	1.77	0.23		
42	East HS	French		Calibrate	0.3 surface					40.8	2/18/02 11:25	1	NEG	0.29	0.03		
43	East HS	French		Calibrate	1.6 surface					40.8	2/18/02 11:27	1.2	POS	1.93	0.15		
44	East HS	French		Calibrate	1.0 surface					42.2	2/18/02 11:30	1	POS	1.05	0.09		
45	East HS	French	1	E stair to Green Rm	Wall	Plaster		Intact	White	42.1	2/18/02 11:37	1	NEG	0.00	0.03		
46	East HS	French	0	E stair to Green Rm	Wall	Concrete	Bottom of stairs	Intact	White	40.0	2/18/02 11:39	1	NEG	0.00	0.06		
47	East HS	French	0	Green Rm under Stage	Ceiling Ctr	Metal	Joist Hanger	Intact	White	76.1	2/18/02 11:45	2.5	NEG	0.71	0.10		
48	East HS	French	0	Green Rm under Stage	Ceiling Ctr	Metal	Joist Hanger	Intact	White	40.1	2/18/02 11:49	2.2	NEG	0.39	0.09		
49	East HS	French	0	Green Rm W Storage	Wall	Plaster		Intact	Black	42.2	2/18/02 11:58	1	NEG	0.00	0.02		
50	East HS	French	1	Stage	Floor	Wood		Intact	Black	43.8	2/18/02 12:01	1	NEG	0.00	0.04		
51	East HS	French	1	Auditorium, West Wall	Wall	Plaster	Bromine Interference	Intact	Blue	42.0	2/18/02 12:04	2.9	NEG	0.03	0.09	Bromine Interference	
52	East HS	French	1	Auditorium, West Exit	Wall	Plaster	Bromine Interference	Intact	Blue	28.0	2/18/02 12:07	10	INCOM	0.56	0.54	Bromine Interference	
53	East HS	French	2	Audit. Fan Rm	Fan Housing	Metal	RA Fan #18	Intact	Grey	41.6	2/18/02 12:39	1	NEG	0.02	0.01		

No	Site	Inspect	Floor	Room	Structure	Substrate	Feature	Condit	Color	Ssec	Date/Time	Depth Index	Results		
													LBP	mg/cm2	"+/-"
54	East HS	French	1	Corridor 3000	Door to Rm 71	Metal	Jamb	Intact	Blue	40.1	2/18/02 13:00	1.4	NEG	0.04	0.03
55	East HS	French	1	Room 71	Wall	Drywall	Vinyl covered GWB	Intact	Beige	42.1	2/18/02 13:04	1	NEG	0.00	0.04
56	East HS	French	1	Room 71	Wall	Concrete	CMU	Intact	Beige	42.1	2/18/02 13:06	1	NEG	0.01	0.01
57	East HS	French	1	Room 71	Door to Rm 73	Metal	Jamb	Intact	Blue	41.0	2/18/02 13:09	1.7	NEG	0.03	0.03
58	East HS	French	1	Room 71	Wall	Plaster	Exterior	Intact	Beige	42.2	2/18/02 13:11	1	NEG	0.00	0.05
59	East HS	French	1	Corridor 3000	Wall	Concrete	Paint band	Intact	Red	42.2	2/18/02 13:14	8.6	NEG	0.21	0.62
60	East HS	French	1	Corridor 4200	Wall	Concrete	CAB	Intact	White	42.2	2/18/02 13:16	1	NEG	0.00	0.05
61	East HS	French	1	Room 75	Wall	Plaster	Exterior	Intact	White	42.2	2/18/02 13:27	1	NEG	0.00	0.03
62	East HS	French	1	Room 75	Wall	Drywall	Vinyl covered GWB	Intact	White	42.2	2/18/02 13:29	1	NEG	0.00	0.00
63	East HS	French	1	Science NW2	Ceiling Center	Metal	Open web Joist	Intact	Red	40.5	2/18/02 13:34	1	NEG	0.03	0.01
64	East HS	French	1	Room 77	Wall	Wood	"Marlite"	Intact	Beige	41.9	2/18/02 13:38	1	NEG	0.00	0.01
65	East HS	French	1	Home Ec Storage	Wall	Drywall		Intact	Beige	42.0	2/18/02 13:45	1	NEG	0.00	0.03
66	East HS	French	1	Room 79	Wall	Wood	"Marlite"	Intact	Beige	40.3	2/18/02 13:48	1	NEG	0.00	0.00
67	East HS	French	1	Room 79	Wall	Metal	Radiator	Intact	Beige	40.5	2/18/02 13:50	1.3	NEG	0.01	0.03
68	East HS	French	1	Corridor to Boiler Rm	Wall	Concrete	CMU	Intact	Beige	42.1	2/18/02 13:52	2.7	NEG	0.11	0.07
69	East HS	French	1	Boys Restroom	Wall	Ceramic	4"x4"	Intact	Beige	21.2	2/18/02 13:55	1.7	POS	17.68	1.44
70	East HS	French	1	Boys Restroom	Wall	Concrete	CMU	Intact	Beige	42.2	2/18/02 13:57	1	NEG	0.00	0.00
71	East HS	French	1	Girls Restroom	Wall	Ceramic	4"x4"	Intact	Beige	15.4	2/18/02 13:59	1.7	POS	19.01	1.77
72	East HS	French	1	Girls Restroom	Floor	Ceramic	1"x1"	Intact	Yellow	40.7	2/18/02 14:00	1.9	NEG	0.01	0.12
73	East HS	French	1	Boys Restroom	Floor	Ceramic	1"x1"	Intact	Brown	41.2	2/18/02 14:02	2.1	NEG	0.01	0.10
74	East HS	French		Shutter Cal 1						35.5	2/18/02 15:21	0	...	NA	
75	East HS	French		Calibration	1.6 surface					41.0	2/18/02 15:22	1.1	POS	1.69	0.13
76	East HS	French		Calibration	0.3 surface					40.7	2/18/02 15:24	1	NEG	0.31	0.05
77	East HS	French		Calibration	1.0 buried					40.8	2/18/02 15:28	2.5	POS	1.14	0.18
78	East HS	French	2	Corridor 1800	Wall	Concrete	CAB	Intact	Red	41.7	2/18/02 15:37	1.6	NEG	0.01	0.11
79	East HS	French	2	Corridor 1800	Wall	Concrete	CAB	Intact	Blue	40.5	2/18/02 15:39	2.3	NEG	0.01	0.07
80	East HS	French	2	Fan Rm 15	Fan Housing	Metal	Return Fan 4	Intact	Orange	43.9	2/18/02 15:42	1.1	POS	1.03	0.09
81	East HS	French	2	Fan Rm 15	Support Structure	Metal	Angle Iron Base	Intact	Red	41.1	2/18/02 15:44	1.4	NEG	0.02	0.03
82	East HS	French	2	Fan Rm 15	Wall	Concrete		Intact	Blue	40.1	2/18/02 15:46	1	NEG	0.00	0.01
83	East HS	French	2	Fan Rm 15	Wall	Drywall		Intact	Blue	42.3	2/18/02 15:48	1	NEG	0.00	0.00
84	East HS	French	2	Fan Rm 15	Housing	Metal	AHU-2	Intact	Grey	41.0	2/18/02 15:50	4	NEG	0.08	0.25
85	East HS	French	2	Boys Restroom	Wall	Ceramic	4"x4"	Intact	Green	20.3	2/18/02 16:03	2	POS	6.24	0.97
86	East HS	French	1	Corridor 4600	Wall	Concrete	by Stairs	Intact	White	42.2	2/18/02 16:07	1	NEG	0.00	0.04
87	East HS	French	1	Room 109	Wall	Concrete	CMU	Intact	White	42.0	2/18/02 16:10	2.2	NEG	0.06	0.05
88	East HS	French	1	Room 109	Wall	Drywall	Vinyl covered GWB	Intact	White	40.9	2/18/02 16:12	1.4	NEG	0.00	0.06
89	East HS	French	1	Room 111	Wall	Concrete	CMU	Intact	White	41.7	2/18/02 16:14	2.1	NEG	0.10	0.06
90	East HS	French	1	Room 111	Door	Metal	Door	Intact	Blue	40.6	2/18/02 16:17	1.1	NEG	0.22	0.04
91	East HS	French	1	Room 111	Door	Metal	Jamb	Intact	Blue	42.0	2/18/02 16:18	1.3	NEG	0.08	0.03
92	East HS	French	1	Room 113	Wall	Drywall	Vinyl covered GWB	Intact	White	42.2	2/18/02 16:40	1	NEG	0.01	0.01
93	East HS	French	1	Room 113	Wall	Drywall	Vinyl covered GWB	Intact	White	40.4	2/18/02 16:42	3.5	POS	1.68	0.27
94	East HS	French	1	Room 113	Wall	Concrete	CMU	Intact	White	41.9	2/18/02 16:45	1.5	NEG	0.06	0.03
95	East HS	French	1	Corridor 4600	Locker #2434	Metal	Door Out	Intact	Blue	41.6	2/18/02 16:48	1.2	NEG	0.02	0.02
96	East HS	French	1	Walkway 3000	Wall	Concrete	Stub Wall	Intact	White	42.2	2/18/02 16:51	1	NEG	0.00	0.00
97	East HS	French	1	Walkway 3000	Floor Ctr	Concrete		Intact	White	42.2	2/18/02 16:53	1	NEG	0.00	0.01
98	East HS	French	1	Walkway 3000	Ceiling Beam	Metal	Cross Brace	Intact	Red	41.4	2/18/02 16:56	1.8	NEG	0.04	0.03
99	East HS	French	2	New Track	Ceiling Beam	Metal	Open web Joist	Intact	White	41.6	2/18/02 17:03	1.2	NEG	0.10	0.03
100	East HS	French	2	New Track	Ceiling Beam	Metal	Open web Joist	Intact	White	43.1	2/18/02 17:05	1.2	NEG	0.08	0.03
101	East HS	French	2	New Track	Wall	Concrete	CMU	Intact	White	42.2	2/18/02 17:09	1	NEG	0.00	0.00
102	East HS	French	1	Entry/exit 6	Floor	Concrete		Intact	Red	41.9	2/18/02 17:37	1	NEG	0.00	0.00
103	East HS	French	1	Corridor 1000	Wall	Concrete	Column	Intact	White	42.1	2/18/02 17:39	2.2	NEG	0.05	0.05
104	East HS	French	1	Corridor 1000	Floor	Quarry Tile	Non-slip ramp	Intact	Red	41.8	2/18/02 17:41	1	NEG	0.00	0.03
105	East HS	French		Calibrate	1.6 buried					40.5	2/18/02 17:43	2.5	POS	1.87	0.24
106	East HS	French		Calibrate	0.3 buried					41.5	2/18/02 17:44	2.1	NEG	0.28	0.08
107	East HS	French		Calibrate	1.0 surface					46.3	2/18/02 17:45	1.1	POS	1.14	0.10
108	East HS	French		Shutter Cal 1						35.4	2/19/02 15:45	0	...	NA	
109	East HS	French		Shutter Cal 1						35.5	2/19/02 17:58	0	...	NA	
110	East HS	French		Calibrate	1.0 buried					41.4	2/19/02 17:59	2.1	POS	0.96	0.14

No	Site	Inspect	Floor	Room	Structure	Substrate	Feature	Condit	Color	Ssec	Date/Time	Depth Index	Results		
													LBP	mg/cm2	" +/- "
111	East HS	French		Calibrate	1.1 buried					43.0	2/19/02 18:00	2.3	POS	1.68	0.20
112	East HS	French		Calibrate	3.5 surface					42.8	2/19/02 18:01	1.2	POS	3.96	0.25
113	East HS	French		Calibrate	1.0 surface					42.9	2/19/02 18:03	1	POS	1.05	0.09
114	East HS	French	2	Above Fan Rm 8	Ceiling Beam	Metal	Open web Joist		Red	40.1	2/19/02 18:10	1	NEG	0.02	0.01
115	East HS	French	1	New IMC,	Ceiling Beam	Metal	"I" beam from infill		Red	41.1	2/19/02 18:15	1.8	NEG	0.02	0.04
116	East HS	French	2	Auditorium "Bridge"	Ceiling Beam	Metal	Open web Joist		Blue	40.8	2/19/02 18:28	1	NEG	0.03	0.02
117	East HS	French	2	Auditorium "Bridge"	Ceiling	Plaster	Slipped		Blue	5.5	2/19/02 18:31	1.9	VOID	VOID	0.18
118	East HS	French	2	Auditorium "Bridge"	Ceiling	Plaster	Bromine Interference		Blue	40.1	2/19/02 18:31	3.9	NEG	0.03	0.11
119	East HS	French	2	Auditorium "Bridge"	Ceiling	Drywall	Above "Bridge"		Blue	42.1	2/19/02 18:36	1	NEG	0.00	0.05
120	East HS	French	2	Auditorium "Bridge"	Ceiling Beam	Metal	Open web Joist		Blue	41.4	2/19/02 18:40	1.8	NEG	0.04	0.03
121	East HS	French	1	Prop Storage, 183	Door to Exit Hall	Metal	Jamb		Blue	42.0	2/19/02 18:50	1.2	NEG	0.01	0.02
122	East HS	French	1	Prop Storage, 183	Door to Corridor	Metal	Jamb		Blue	42.1	2/19/02 18:51	1	NEG	0.01	0.00
123	East HS	French	1	Dance 186	Door to IMC exit	Metal	Jamb		Blue	41.5	2/19/02 18:54	1	NEG	0.00	0.00
124	East HS	French	1	Dance 186	Wall by N exit	Concrete	CMU		Beige	44.1	2/19/02 18:56	1.8	NEG	0.00	0.05
125	East HS	French	1	Dance 186 Dressing Rm	Wall	Drywall			Beige	46.7	2/19/02 18:58	1	NEG	0.00	0.00
126	East HS	French	1	Dance 186 Dressing Rm	Floor	Concrete			Blue	43.9	2/19/02 19:00	1	NEG	0.00	0.00
127	East HS	French	1	Dance 186	Stairs to Dressing	Metal	Stringer		Blue	41.5	2/19/02 19:03	1	NEG	0.00	0.00
128	East HS	French	1	Corridor 2600	Frame Only, N end	Metal	Jamb		Red	42.1	2/19/02 19:09	1.3	NEG	0.02	0.02
129	East HS	French	1	Counseling 187	Door to Rm 187B	Metal	Jamb		Blue	41.8	2/19/02 19:11	1.2	NEG	0.08	0.03
130	East HS	French	1	Counseling 187	Window to Rm 187B	Wood	Stool		Blue	42.0	2/19/02 19:13	1	NEG	0.00	0.05
131	East HS	French	1	Counseling 187	Wall to 187C	Drywall	Vinyl covered GWB		Beige	41.9	2/19/02 19:15	1	NEG	0.00	0.02
132	East HS	French	1	Counseling 187	Wall	Drywall	Column Enclosure		Beige	44.3	2/19/02 19:17	1	NEG	0.00	0.00
133	East HS	French	1	Conf Rm at E, S room	Wall	Concrete	CMU		Beige	42.1	2/19/02 19:20	1	NEG	0.00	0.02
134	East HS	French		Shutter Cal 1	Inadvertent Reset				...	35.4	2/19/02 19:25	0	...	NA	
135	East HS	French	1	Conf Rm at E, S room	Wall	Concrete	CMU		Beige	42.1	2/19/02 19:25	1	NEG	0.00	0.00
136	East HS	French	1	Mens Restroom	Wall	Ceramic	Baseboard 4"x6"	Intact	Green	15.5	2/19/02 19:28	1.9	POS	5.45	1.10
137	East HS	French	1	Mens Restroom	Floor	Ceramic	1"x1"	Intact	Green	41.3	2/19/02 19:29	10	NEG	-0.05	0.68
138	East HS	French		Calibrate	1.0 surface					57.1	2/19/02 19:33	1.1	POS	1.12	0.08
139	East HS	French		Calibrate	1.6 surface					28.0	2/19/02 19:34	1.1	POS	1.71	0.16
140	East HS	French		Calibrate	0.3 buried					79.3	2/19/02 19:35	2	NEG	0.26	0.05
141	East HS	French		Calibrate	1.0 buried					48.0	2/19/02 19:37	2.2	POS	0.99	0.14

Bromine Interference

ling Descriptions:

Ssec: This is the nominal time in seconds that each sample was analyzed.

Depth Index: Indicates the relative depth of the lead. A Depth Index (DI) of less than 1.5 indicates lead very near the surface layer of paint. A DI between 1.5 and 4.0 indicates moderately covered lead. A DI greater than 4.0 indicates the lead paint is deeply buried beneath multiple layers of paint.

LBP: Results are shown as positive (POS ≥ 1.0 mg/cm²), inconclusive (INC) or negative (NEG < 1.0 mg/cm²). The results are based on the combined results of the K and L shell readings. L shell and K shell readings are not provided. Positive results are also in bold print.

mg/cm²: This is the testing results produced by the NITON XL-309 instrument in milligrams of lead per square centimeter (mg/cm²). The EPA defines lead based paint as paint containing lead at 1.0 mg/cm² or greater. A negative number is a result of an internal computation made by the instrument and should be interpreted as zero. Even though paint may be termed negative (less than 1.0 mg/cm) by EPA definition, disturbance of the paint may still be regulated by OSHA under 29 CFR 1926.62. Where lead is present at any level, appropriate engineering controls, work practices and personal protective equipment should be used until a negative exposure assessment can be determined.

VOID: This indicates that the test was intentionally terminated by the operator due to operator error (e.g. - operator moved analyzer while testing).

APPENDIX E

Suspect Fungal and Bacterial Field Data Sheets and Lab Results



Report for:

Mr. Martin Schwan
EHS-Alaska, Inc.
11901 Business Blvd, Suite 208
Eagle River, AK 99577

Regarding: Eurofins Aerotech Built Environment Testing, Inc.
Project: 8076-ASD EHS Legionella Testing; Legionella and Mold Testing
EML ID: 3343739

Approved by:

A handwritten signature in black ink that reads "Joshua T. Cox".

Business Unit Manager
Joshua Cox

Dates of Analysis:
Direct microscopic exam (Qualitative): 08-08-2023

Service SOPs: Direct microscopic exam (Qualitative) (EM-MY-S-1039)
AIHA-LAP, LLC accredited service, Lab ID #102297

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

Eurofins Aerotech Built Environment Testing, Inc. ("the Company"), a member of the Eurofins Built Environment Testing group of companies, shall have no liability to the client or the client's customer with respect to decisions or recommendations made, actions taken or courses of conduct implemented by either the client or the client's customer as a result of or based upon the Test Results. In no event shall the Company be liable to the client with respect to the Test Results except for the Company's own willful misconduct or gross negligence nor shall the Company be liable for incidental or consequential damages or lost profits or revenues to the fullest extent such liability may be disclaimed by law, even if the Company has been advised of the possibility of such damages, lost profits or lost revenues. In no event shall the Company's liability with respect to the Test Results exceed the amount paid to the Company by the client therefor.

Eurofins Aerotech Built Environment Testing, Inc.'s LabServe® reporting system includes automated fail-safes to ensure that all AIHA-LAP, LLC quality requirements are met and notifications are added to reports when any quality steps remain pending.

Eurofins Aerotech Built Environment Testing, Inc.

1501 West Knudsen Drive, Phoenix, AZ 85027

(800) 651-4802 www.eurofinsus.com/Built

Client: EHS-Alaska, Inc.

C/O: Mr. Martin Schwan

Re: 8076-ASD EHS Legionella Testing; Legionella
and Mold Testing

Date of Sampling: 08-02-2023

Date of Receipt: 08-07-2023

Date of Report: 08-08-2023

DIRECT MICROSCOPIC EXAMINATION REPORT

Background Debris and/or Description	Miscellaneous Spores Present*	MOLD GROWTH: Molds seen with underlying mycelial and/or sporulating structures†	Other Comments††	General Impression
Lab ID-Version‡: 16250478-1, Analysis Date: 08/08/2023: Bulk sample B01: Inside Air Take Duct AHU-2				
Substrate unidentified	Variety	None	None	Normal trapping
Lab ID-Version: 16250479-1, Analysis Date: 08/08/2023: Bulk sample BU6: Inside SA at SQ to RD Duct				
Substrate unidentified	Variety	None	None	Normal trapping
Lab ID-Version: 16250480-1, Analysis Date: 08/08/2023: Bulk sample BU7: Util Duct NWL 1007 ROTC Storage				
Substrate unidentified	Very few	3+ <i>Stachybotrys</i> species	None	Mold growth
Lab ID-Version: 16250462-1, Analysis Date: 08/08/2023: Tape sample TL02: Inside Air Intake Duct at AHU-2				
Moderate	Very few	None	None	Normal trapping
Lab ID-Version: 16250463-1, Analysis Date: 08/08/2023: Tape sample TL03: Base of GWB Wall Below Air Intake				
Heavy	None	3+ <i>Stachybotrys</i> species	None	Mold growth
Lab ID-Version: 16250464-1, Analysis Date: 08/08/2023: Tape sample TL05: AHU-2 Inside Mixing Chamber				
Moderate	Few	None	A few <i>Chaetomium</i> spores detected.	Mold growth in vicinity?

* Indicative of normal conditions, i.e. seen on surfaces everywhere. Includes basidiospores (mushroom spores), myxomycetes, plant pathogens such as ascospores, rusts and smuts, and a mix of saprophytic genera with no particular spore type predominating. Distribution of spore types seen mirrors that usually seen outdoors.

† Quantities of molds seen growing are listed in the MOLD GROWTH column and are graded <1+ to 4+, with 4+ denoting the highest numbers.

†† Some comments may refer to the following: Most surfaces collect a mix of spores which are normally present in the outdoor environment. At times it is possible to note a skewing of the distribution of spore types, and also to note "marker" genera which may indicate indoor mold growth. Marker genera are those spore types which are present normally in very small numbers, but which multiply indoors when conditions are favorable for growth.

‡ A "Version" indicated by "-x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

The limit of detection is < 1+ when mold growth is detected.

For additional information necessary for the interpretation of the results, all readers are advised to refer to the document "Direct Exam Details Page" which is available on our website at:

www.emlab.com/services/mold-testing/direct-microscopic-exam-qualitative/

Eurofins Aerotech Built Environment Testing, Inc.

1501 West Knudsen Drive, Phoenix, AZ 85027

(800) 651-4802 www.eurofinsus.com/Built

Client: EHS-Alaska, Inc.

C/O: Mr. Martin Schwan

Re: 8076-ASD EHS Legionella Testing; Legionella
and Mold Testing

Date of Sampling: 08-02-2023

Date of Receipt: 08-07-2023

Date of Report: 08-08-2023

Mold/Fungal Growth Rating Details

Growth Rating	Quantities of molds indicating growth are listed in the MOLD/FUNGAL GROWTH section. Judgement is used in determining the amount of growth present in the sample. For example, if only one portion of the sample has evidence of heavy growth, then it will receive a rating of heavy growth even though, strictly speaking, on a percentage basis of the entire sample, the amount of growth is low.	
	Swab/Tape/Dust/Wipe sample	Bulk Sample
< 1+ (Very Light Growth)	Evidence of very light growth observed on the sample as indicated by spores of one type seen with underlying mycelial and/or with their sporulating structures found in less than 10% of the microscopic fields examined.	Areas of very light growth detected by the presence of spores of one type seen with underlying mycelial and/or with their sporulating structures in the bulk sample.
1+ (Light Growth)	Evidence of light growth observed on the sample as indicated by spores of one type seen with underlying mycelial and/or with their sporulating structures found in 10 to 25% of the microscopic fields examined.	Areas of light growth detected by the presence of spores of one type seen with underlying mycelial and/or with their sporulating structures in the bulk sample.
2+ (Moderate Growth)	Evidence of moderate growth observed on the sample as indicated by spores of one type seen with underlying mycelial and/or with their sporulating structures found in 26 to 50% of the microscopic fields examined.	Areas of moderate growth detected by the presence of spores of one type seen with underlying mycelial and/or with their sporulating structures in the bulk sample.
3+ (Heavy Growth)	Evidence of heavy growth observed on the sample as indicated by spores of one type seen with underlying mycelial and/or with their sporulating structures found in 51 to 75% of the microscopic fields examined.	Areas of heavy growth detected by the presence of spores of one type seen with underlying mycelial and/or with their sporulating structures in the bulk sample.
4+ (Very Heavy Growth)	Evidence of very heavy growth observed on the sample as indicated by spores of one type seen with underlying mycelial and/or with their sporulating structures found to be nearly confluent in the majority of the microscopic fields examined.	Areas of very heavy growth detected by the presence of spores of one type seen with underlying mycelial and/or with their sporulating structures in the bulk sample.

Miscellaneous Spores

Slides/specimens are examined for the presence of mold spores and pollen, noting the quantities and distribution of spore types found. A designation of 'normal trapping' is made when a mix of spore types is present with the same general distribution as is usually found outdoors. In other words, the biological component of the sample surface is like that found everywhere. Types of spores present would include basidiospores (mushroom spores), myxomycetes (slime molds), plant pathogens such as ascospores, rusts and smuts, and a mix of saprophytic genera with no particular spore type predominating. Many of these spore types would not be found growing indoors on building materials since many plant pathogens require living plants for growth, and mushrooms require compost, leaf duff of various types, or associations with roots of certain trees, etc. Due to these factors, when a mix of spores seen include these types as well as pollen, the rational source is the outside air, rather than indoor mold growth. The numbers of miscellaneous spores seen are graded and described as shown below as none, very few, few, variety, and wide variety.

None	Very Few	Few	Variety	Wide Variety
No spores detected	Very few spores detected	A few spores detected	Many spores containing a variety of different genera detected	Many spores containing a wide variety of different genera detected



Report for:

Mr. Martin Schwan
EHS-Alaska, Inc.
11901 Business Blvd, Suite 208
Eagle River, AK 99577

Regarding: Eurofins EPK Built Environment Testing, LLC
Project: 8076-ASD EHS Legionella Testing; Legionella and Mold Testing
EML ID: 3343739

Approved by:

Dates of Analysis:
PCR-BioRad iQ-Check Legionella: 08-09-2023

A handwritten signature in black ink, appearing to read "Ariunaa Jalsrai".

Technical Manager
Ariunaa Jalsrai

Service SOPs: PCR-BioRad iQ-Check Legionella (EM-BC-S-8452)

This procedure (iQ-Check Legionella spp.) is NF VALIDATION certified according to the validation protocol based on the Standard NF T90-471 (June 2015). The validation scope has been extended to the following reference method: "ISO/TS 12869 (December 2012): Water quality - Detection and quantification of Legionella spp. and/or Legionella pneumophila by concentration and genic amplification by quantitative polymerase chain reaction (qPCR)". The certification includes the use of the CFX96™ Deepwell Touch, the CFX96™ and the Chromo4™ instruments. Certificate number: iQ-Check Legionella spp.: BRD 07/15 -12/07

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

Eurofins EPK Built Environment Testing, LLC ("the Company"), a member of the Eurofins Built Environment Testing group of companies, shall have no liability to the client or the client's customer with respect to decisions or recommendations made, actions taken or courses of conduct implemented by either the client or the client's customer as a result of or based upon the Test Results. In no event shall the Company be liable to the client with respect to the Test Results except for the Company's own willful misconduct or gross negligence nor shall the Company be liable for incidental or consequential damages or lost profits or revenues to the fullest extent such liability may be disclaimed by law, even if the Company has been advised of the possibility of such damages, lost profits or lost revenues. In no event shall the Company's liability with respect to the Test Results exceed the amount paid to the Company by the client therefor.

Eurofins EPK Built Environment Testing, LLC
 3000 Lincoln Drive East, Suite A, Marlton, NJ 08053
 (866) 871-1984 www.eurofinsus.com/Built

Client: EHS-Alaska, Inc.

C/O: Mr. Martin Schwan

Re: 8076-ASD EHS Legionella Testing; Legionella
 and Mold Testing

Date of Sampling: 08-02-2023

Date of Receipt: 08-07-2023

Date of Report: 08-10-2023

LEGIONELLA: PCR METHODOLOGY

Location:	S04: Top East SA Duct, Above Access		S08: Util Duct NWL 1007 ROTC Storage	
Comments (see below)	None		None	
Sample Type:	Water sample		Water sample	
Lab ID-Version‡:	16252132-1		16252136-1	
Sample Size:	1		1	
Unit:	liter		liter	
	GU*	GU*/Unit	GU*	GU*/Unit
Legionella spp.	1,900	1,500,000,000	510	450,000,000

*Genome units

ND = Not Detected

Comments:

Legionella spp.: includes detection of all common Legionella species

‡A "Version" indicated by "-x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

Eurofins EPK Built Environment Testing, LLC

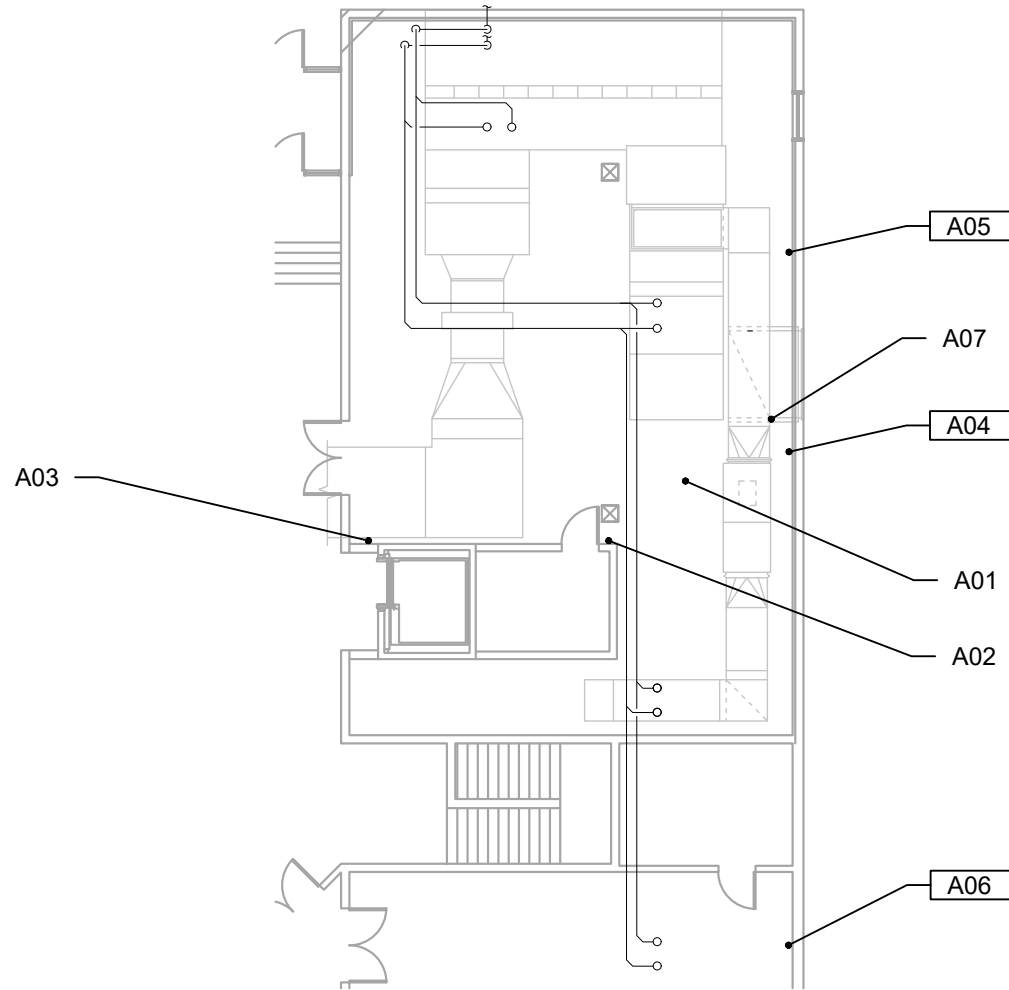
EMLab ID: 3343739, Page 2 of 2

Bettye Davis East Anchorage HS Safety Upgrades Academic Area
 Project 830717

Section 02 26 00 - Page 154 of 249

APPENDIX F

Drawings of Sample Locations



1
C-1

LOWER LEVEL AREA "B" FAN ROOM PLAN
 NTS



LEGEND

- AXX ASBESTOS TEST LOCATION
- [AXX] LAB TEST RESULTS POSITIVE FOR ASBESTOS

REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EH-823- PREFIX.

ANCHORAGE
 SCHOOL
 DISTRICT

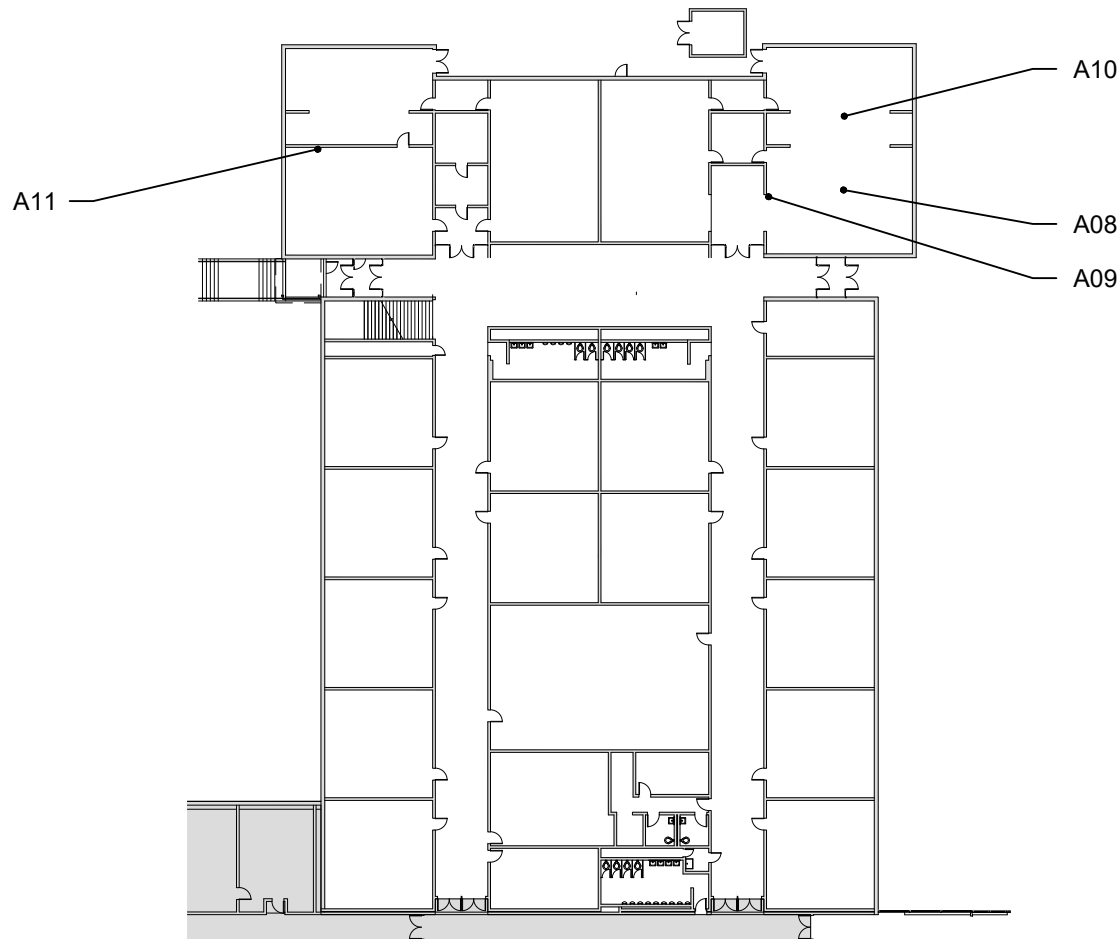
EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS SAMPLE LOCATIONS



EHS ALASKA
 INCORPORATED

ENGINEERING, HEALTH & SAFETY CONSULTANTS

DRAWN: JHL	DATE: 08/03/2023
CHECK: RAF	DWG.NO: C-1
FILE #: 8021-SL	



1
C-2

LEVEL 1 AREA F PLAN
NTS

LEGEND

- AXX ASBESTOS TEST LOCATION
- AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS

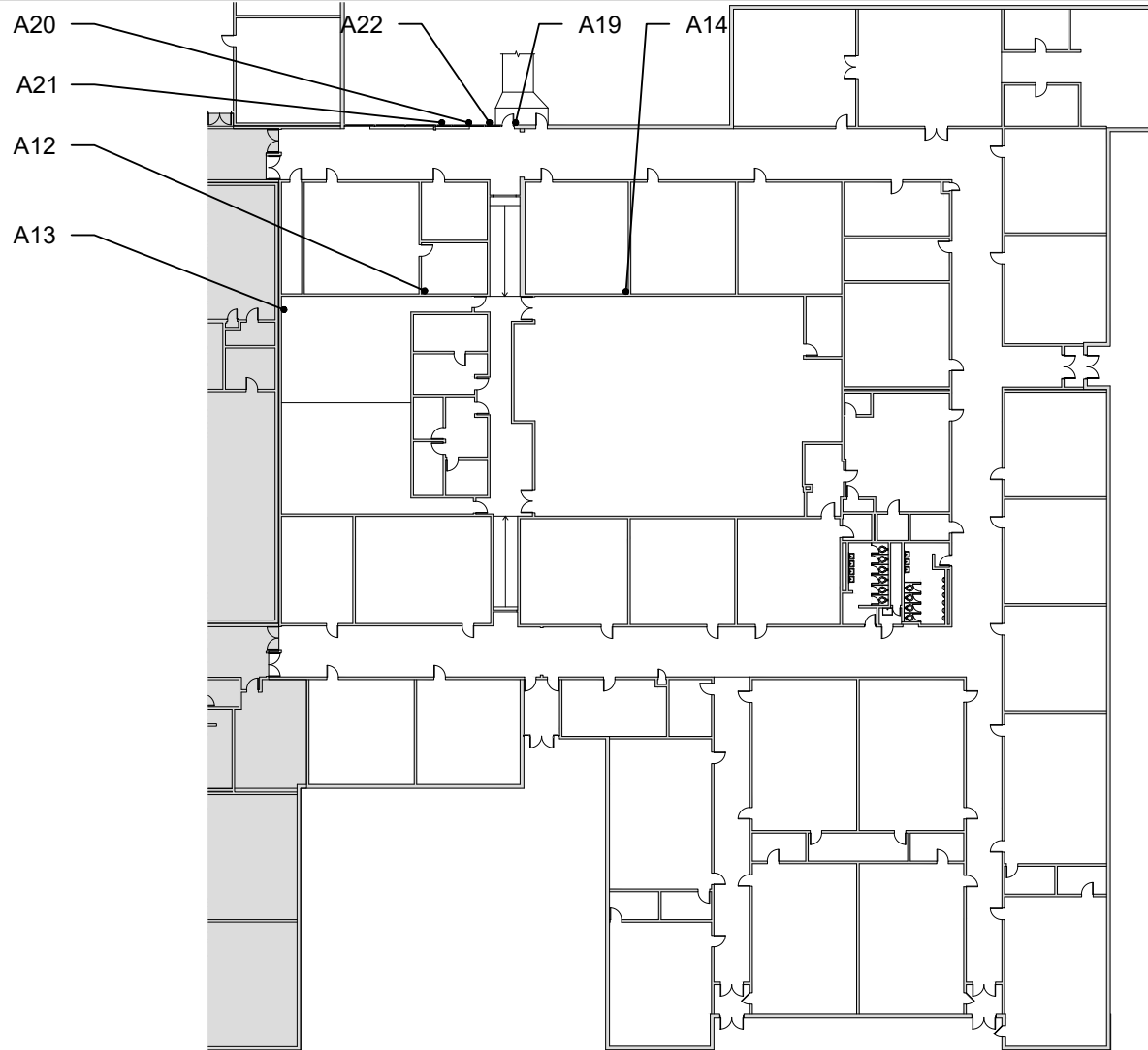
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EH-823- PREFIX.

ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
ASBESTOS SAMPLE LOCATIONS



DRAWN: JHL	DATE: 08/03/2023
CHECK: RAF	DWG.NO: C-2
FILE #: 8021-SL	



LEGEND

- AXX ASBESTOS TEST LOCATION
- AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS

REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EH-823- PREFIX.

1
C-3

LEVEL 1 AREA E PLAN
 NTS



ANCHORAGE
 SCHOOL
 DISTRICT

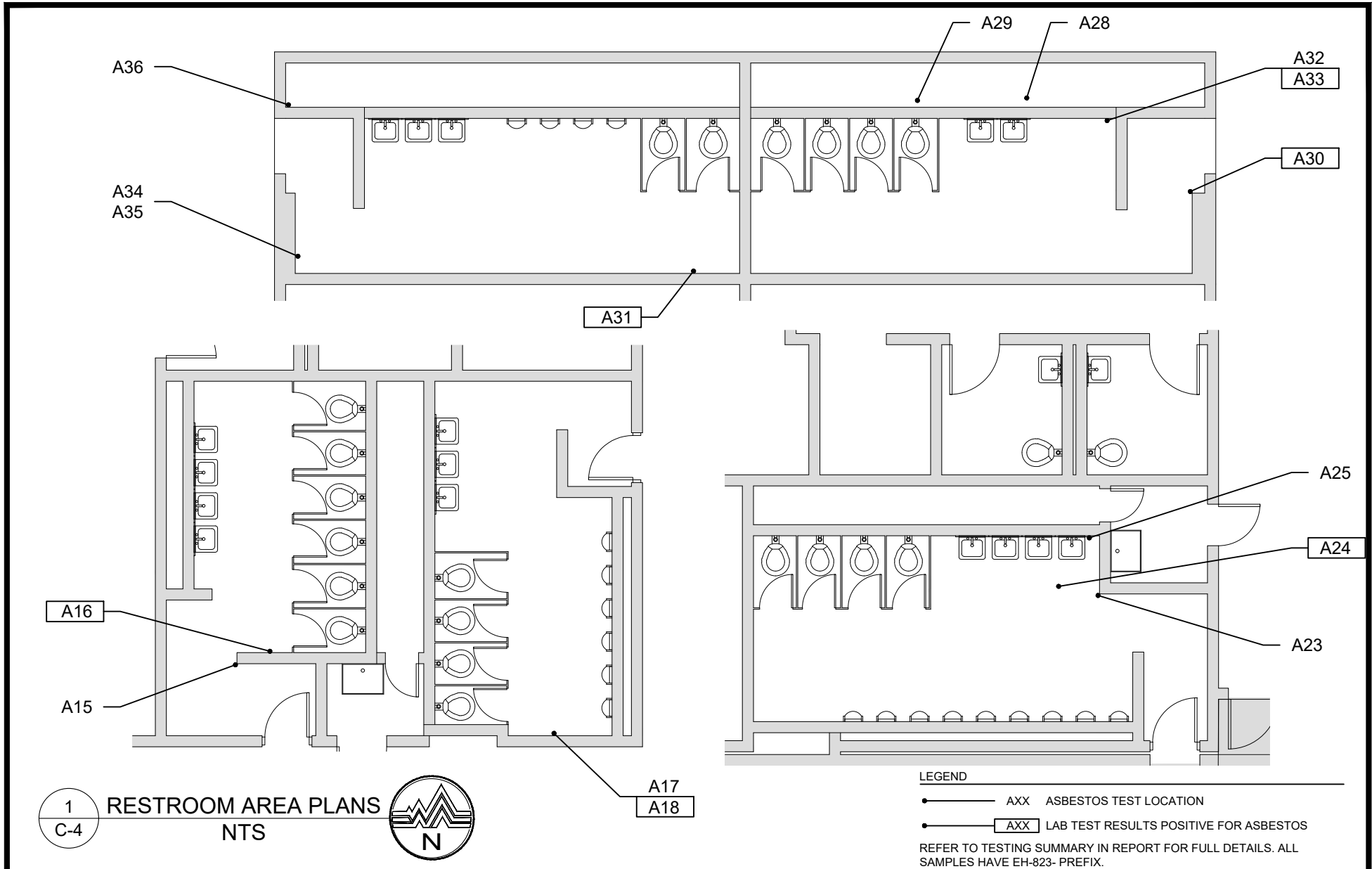
EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS SAMPLE LOCATIONS



EHS ALASKA
 INCORPORATED

ENGINEERING, HEALTH & SAFETY CONSULTANTS

DRAWN: JHL	DATE: 08/03/2023
CHECK: RAF	DWG.NO: 8021-SL
FILE #: 8021-SL	C-3

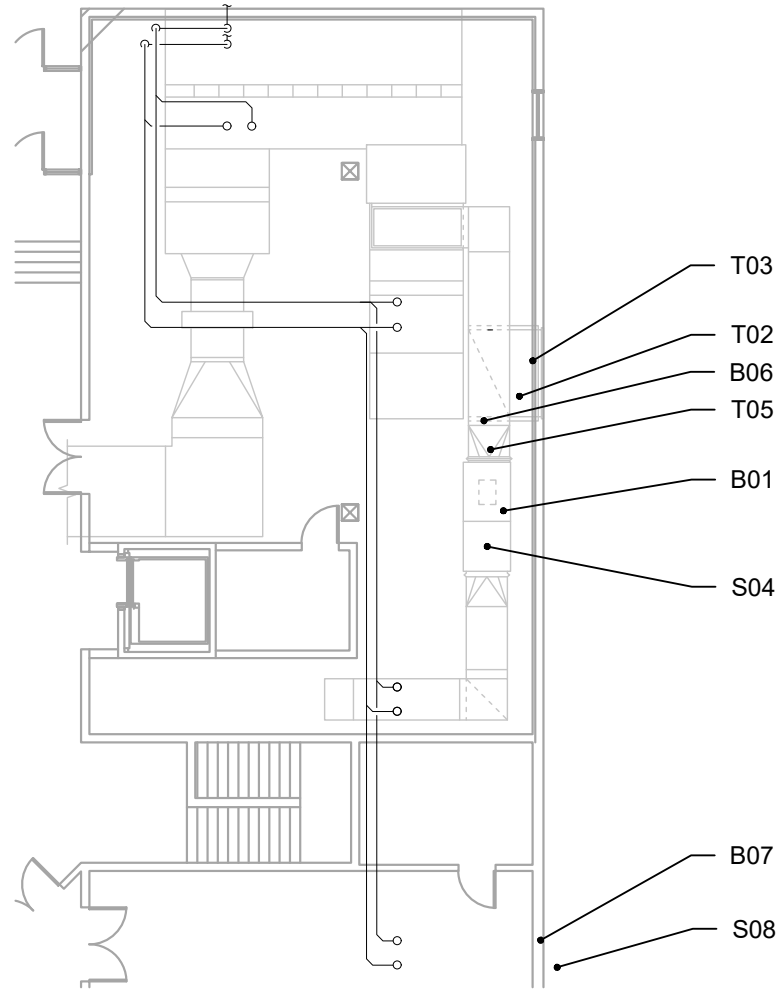


1 RESTROOM AREA PLANS
 C-4 NTS

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS SAMPLE LOCATIONS



DRAWN: JHL	DATE: 08/03/2023
CHECK: RAF	DWG.NO: C-4
FILE #: 8021-SL	



LEGEND

- BXX BULK MOLD SAMPLE LOCATION
- TXX TAPE LIFT MOLD SAMPLE LOCATION
- SXX LEGIONELLA SAMPLE LOCATION

1
C-5

LOWER LEVEL AREA "B" FAN ROOM PLAN
 NTS

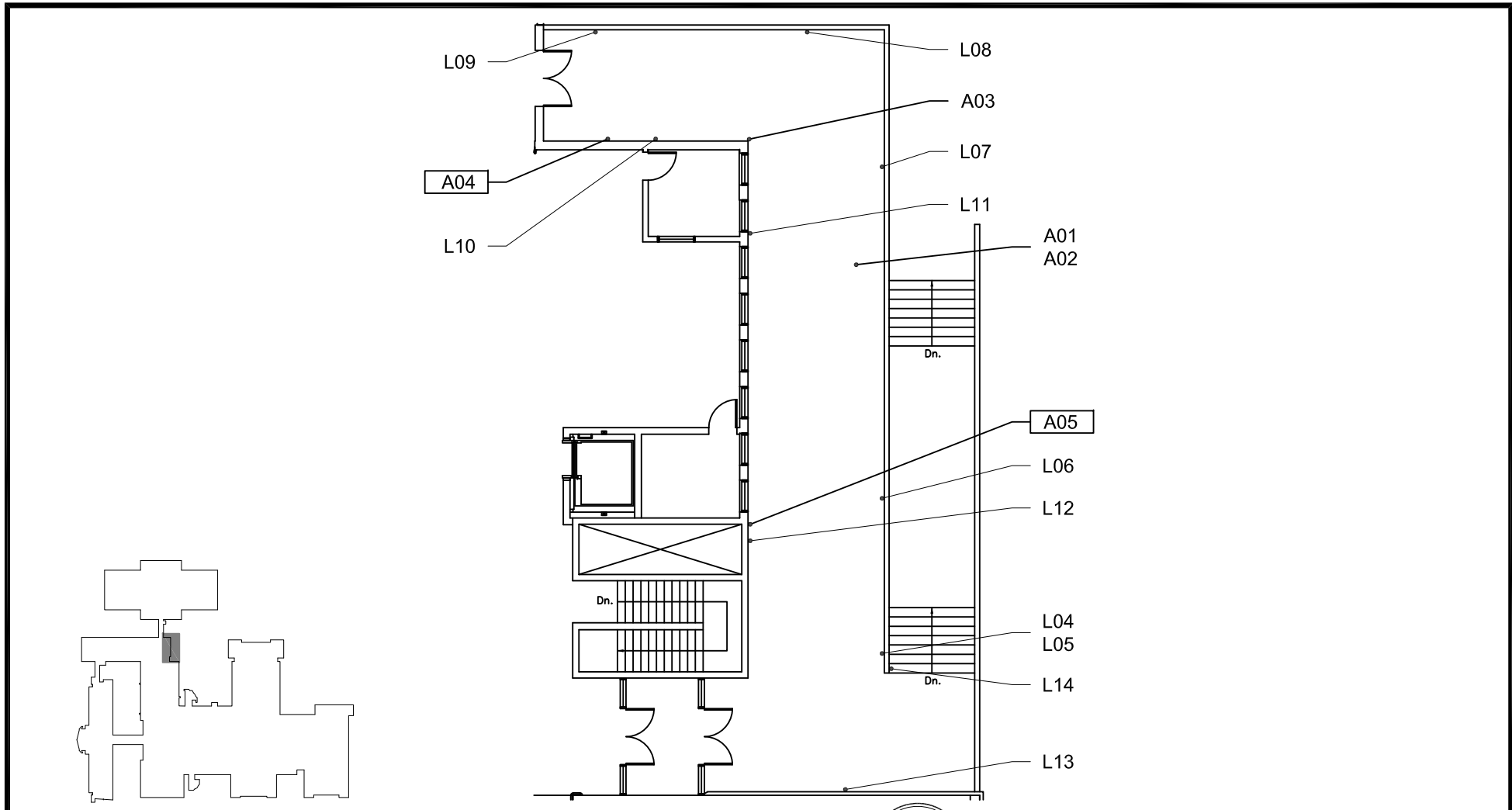


ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 FUNGAL & BACTERIAL SAMPLES



DRAWN: JHL	DATE: 08/03/2023
CHECK: RAF	DWG.NO:
FILE #: 8021-SL	C-5



LEGEND
 — LXX LEAD TEST LOCATION
 — LXX LEAD TEST CLASSIFIED AS LEAD BASED PAINT
 REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

1 LEVEL 1 - WALKWAY
 C-1 NTS

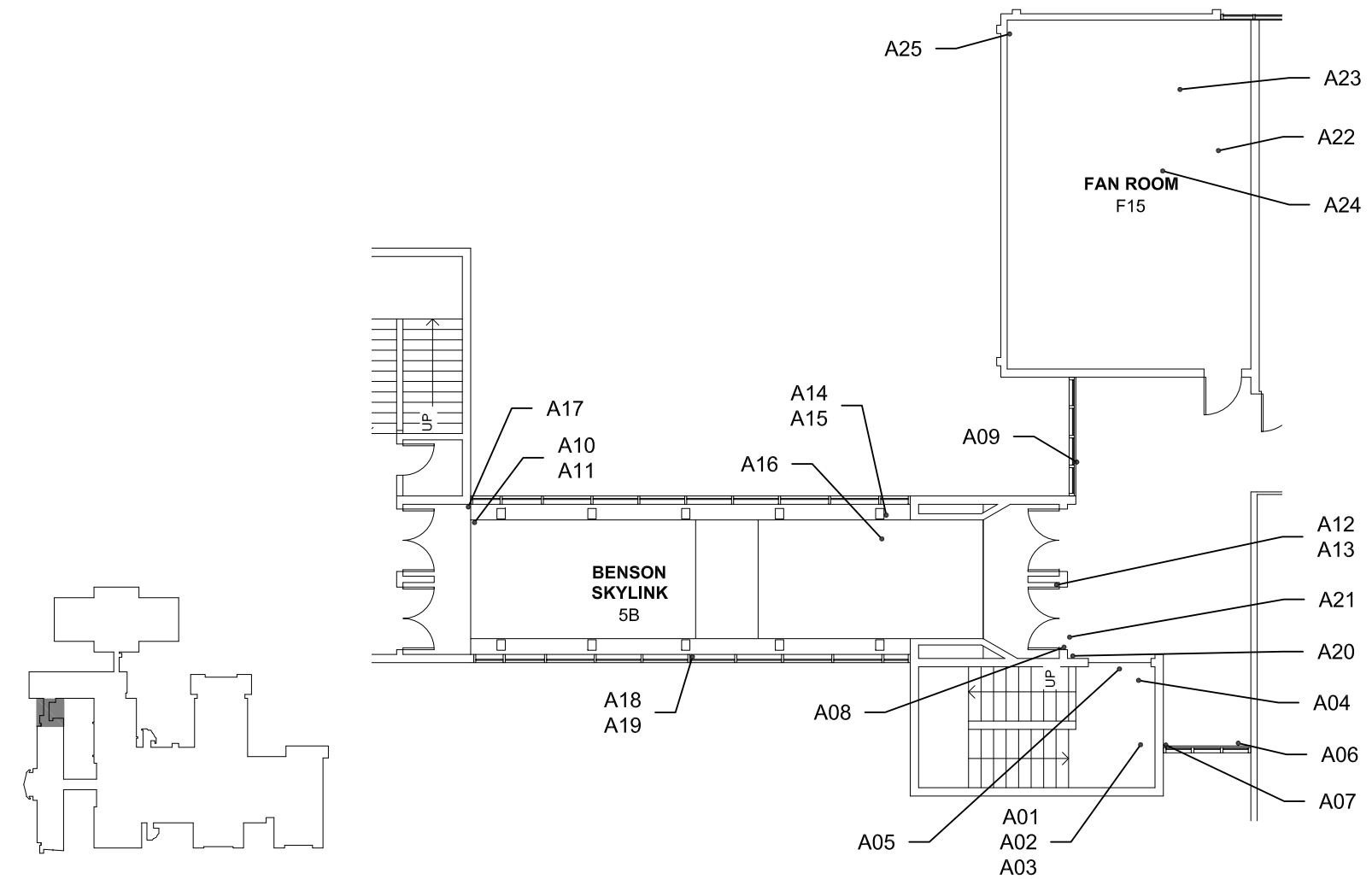
LEGEND
 — AXX ASBESTOS TEST LOCATION
 — AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS
 REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EB1220- PREFIX.

ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS & LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 12/11/2020
CHECK: RAF	DWG.NO:
FILE #: 7814-SL	C-1



1
C-1

**BENSON BUILDING,
SECOND FLOOR, NORTH
NTS**

LEGEND

—●— AXX ASBESTOS TEST LOCATION

—AXX— LAB TEST RESULTS POSITIVE FOR ASBESTOS

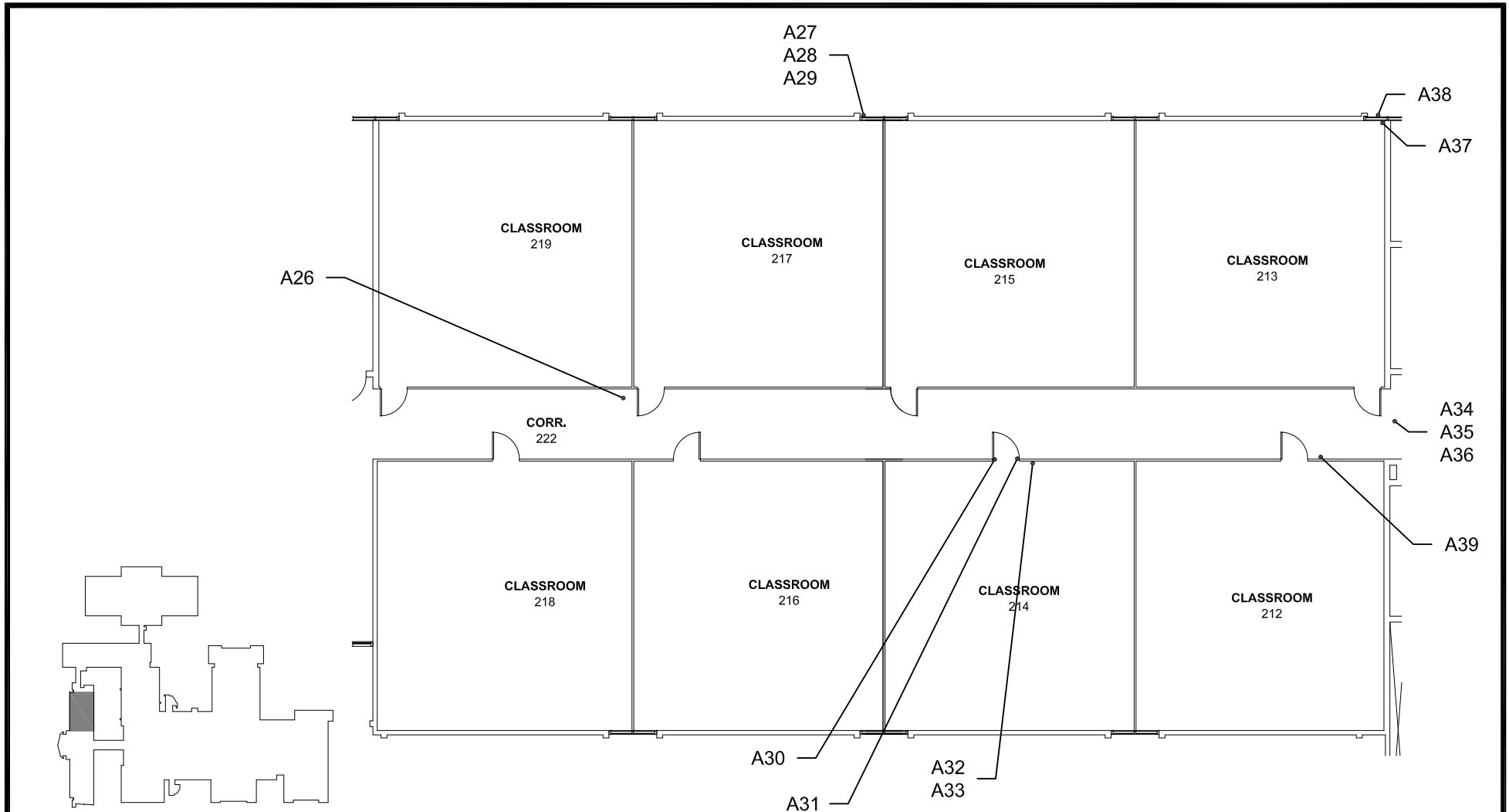
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EB0421- PREFIX.

**ANCHORAGE
SCHOOL
DISTRICT**

**EAST HIGH SCHOOL
ANCHORAGE, ALASKA
ASBESTOS SAMPLE LOCATIONS**



DRAWN: CTO	DATE: 04/25/2021
CHECK: RAF	DWG.NO:
FILE #:	C-1
7806-SL2	



1
C-2

**BENSON BUILDING,
 SECOND FLOOR, NORTH-CENTRAL
 NTS**



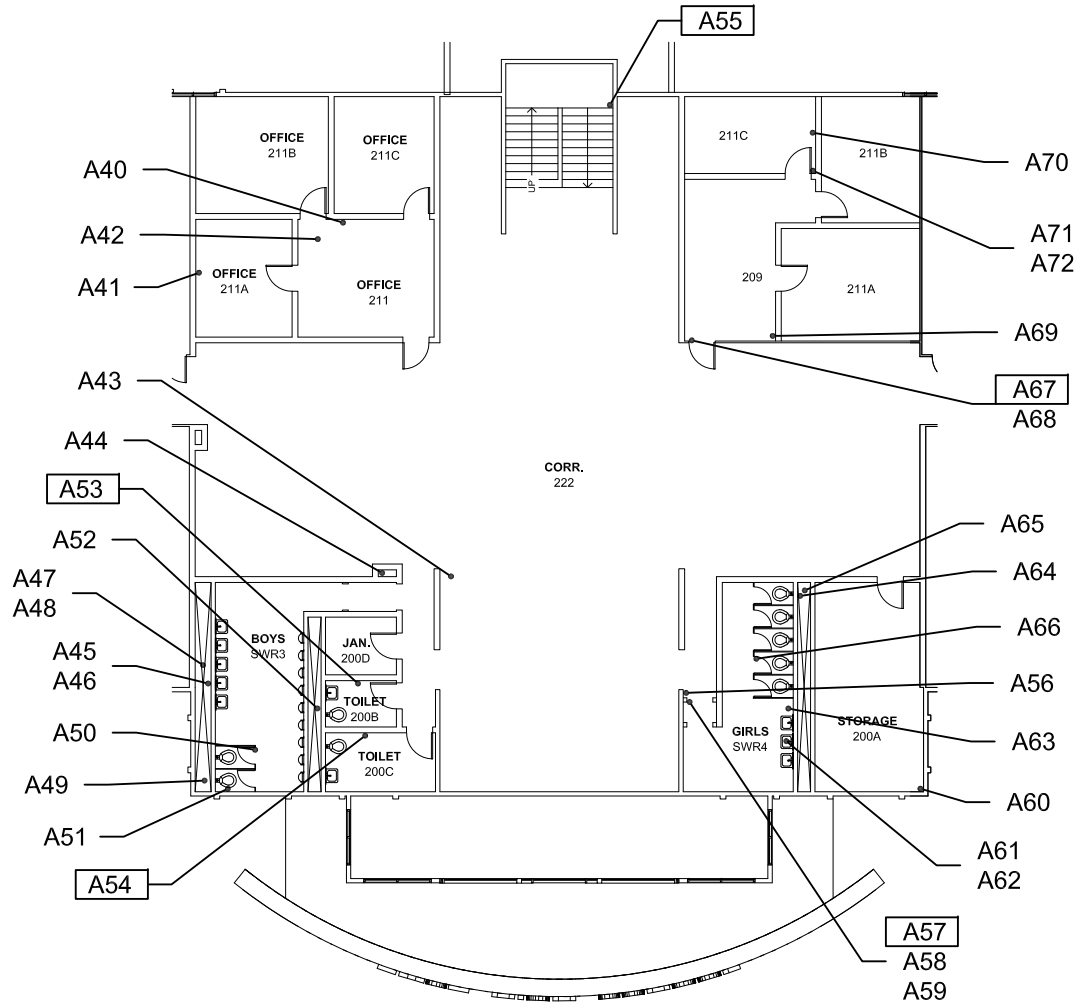
LEGEND
 — AXX ASBESTOS TEST LOCATION
 — AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS
 REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL
 SAMPLES HAVE EB0421- PREFIX.

**ANCHORAGE
 SCHOOL
 DISTRICT**

**EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS SAMPLE LOCATIONS**



DRAWN: CTO	DATE: 04/25/2021
CHECK: RAF	DWG.NO: C-2
FILE #: 7806-SL2	



1
 C-3 **BENSON BUILDING,
 SECOND FLOOR, CENTRAL
 NTS**

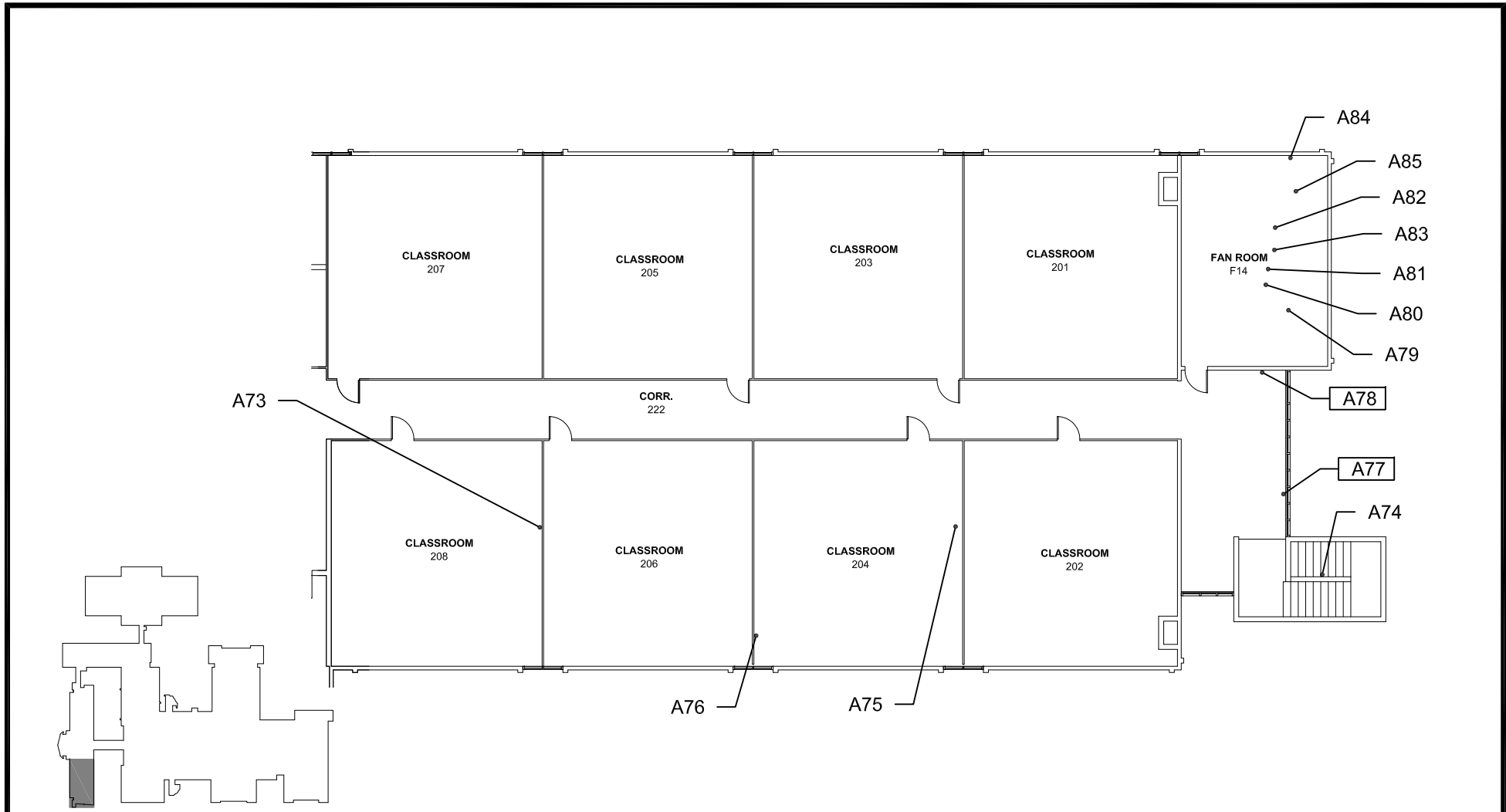
LEGEND
 — AXX ASBESTOS TEST LOCATION
 — [AXX] LAB TEST RESULTS POSITIVE FOR ASBESTOS
 REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL
 SAMPLES HAVE EB0421- PREFIX.

ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS SAMPLE LOCATIONS



DRAWN: CTO	DATE: 04/25/2021
CHECK: RAF	DWG.NO:
FILE #: 7806-SL2	C-3



1
 C-4

**BENSON BUILDING,
 SECOND FLOOR, SOUTH
 NTS**

LEGEND

— AXX ASBESTOS TEST LOCATION

— [AXX] LAB TEST RESULTS POSITIVE FOR ASBESTOS

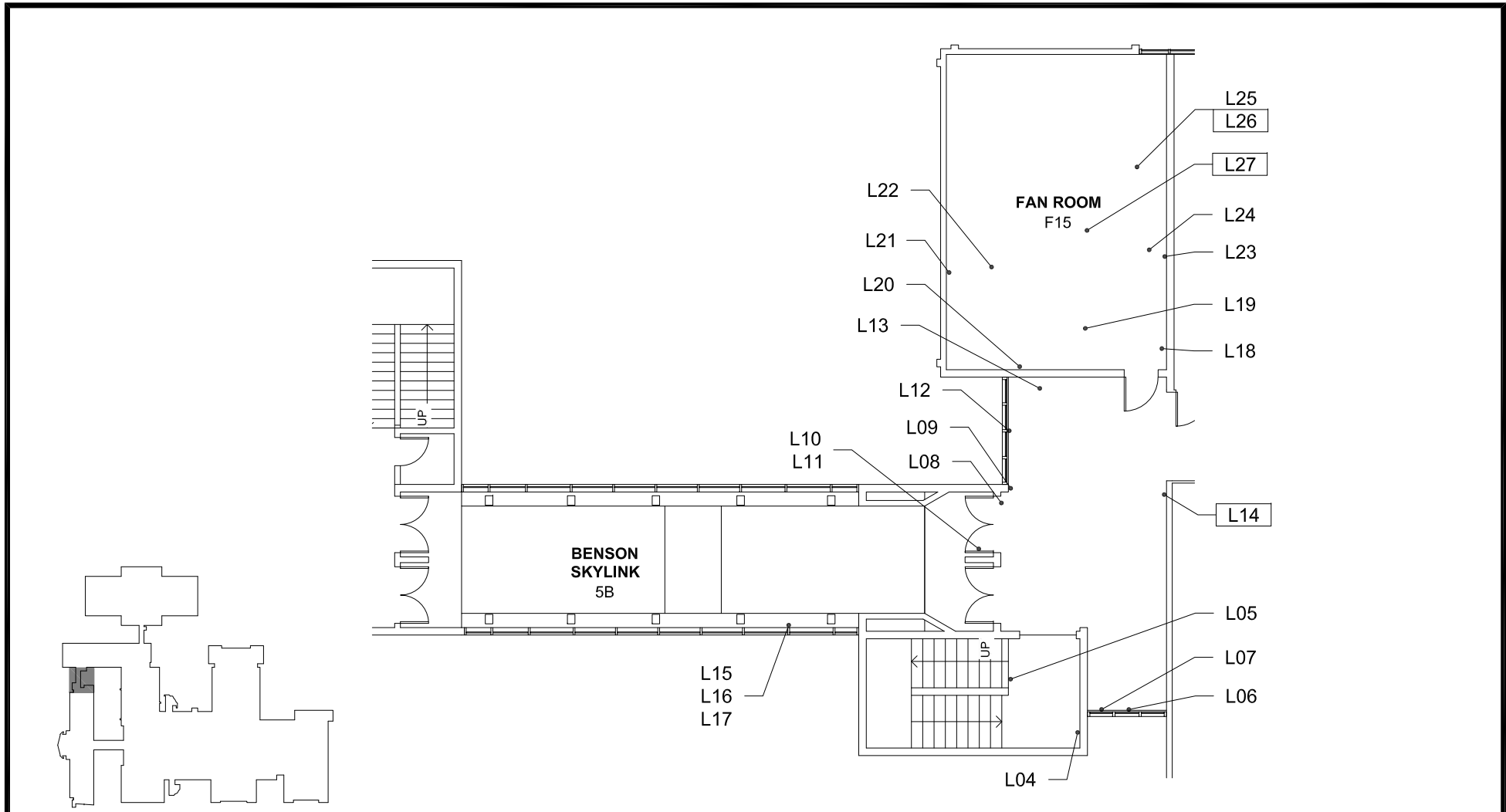
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EB0421- PREFIX.

**ANCHORAGE
 SCHOOL
 DISTRICT**

**EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS SAMPLE LOCATIONS**



DRAWN: CTO	DATE: 04/25/2021
CHECK: RAF	DWG.NO: C-4
FILE #: 7806-SL2	



LEGEND

- LXX LEAD TEST LOCATION
- LXX LEAD TEST CONTAINING ≥ 1.0 mg/cm² OF LEAD

REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

1
C-5

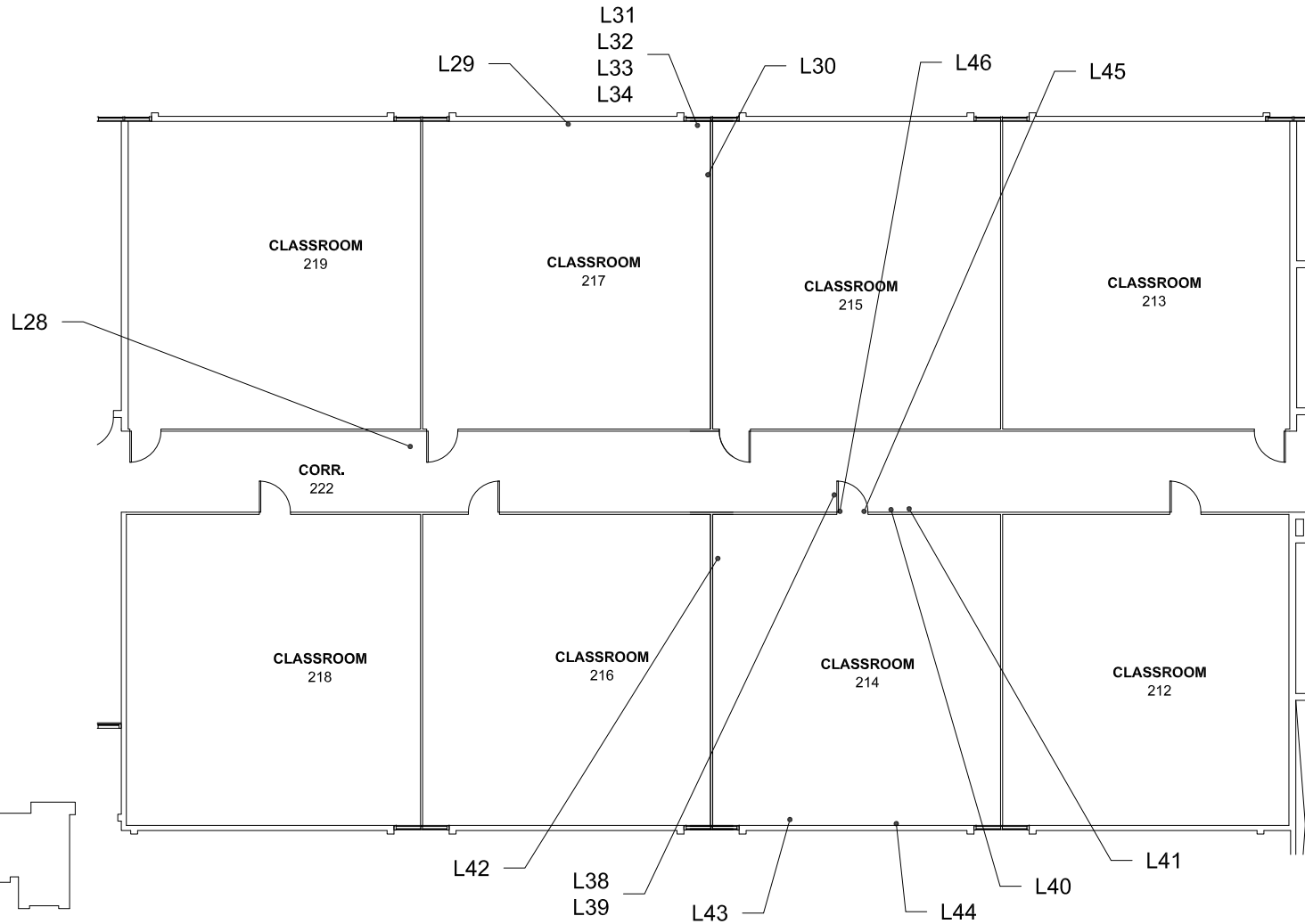
**BENSON BUILDING,
SECOND FLOOR, NORTH
NTS**

**ANCHORAGE
SCHOOL
DISTRICT**

**EAST HIGH SCHOOL
ANCHORAGE, ALASKA
LEAD SAMPLE LOCATIONS**

**EHS ALASKA
INCORPORATED**
ENGINEERING, HEALTH & SAFETY CONSULTANTS

DRAWN: CTO	DATE: 04/25/2021
CHECK: RAF	DWG.NO: C-5
FILE #: 7806-SL2	



1
C-6

**BENSON BUILDING,
 SECOND FLOOR, NORTH-CENTRAL
 NTS**



LEGEND

- LXX LEAD TEST LOCATION
- LXX LEAD TEST CONTAINING ≥ 1.0 mg/cm² OF LEAD

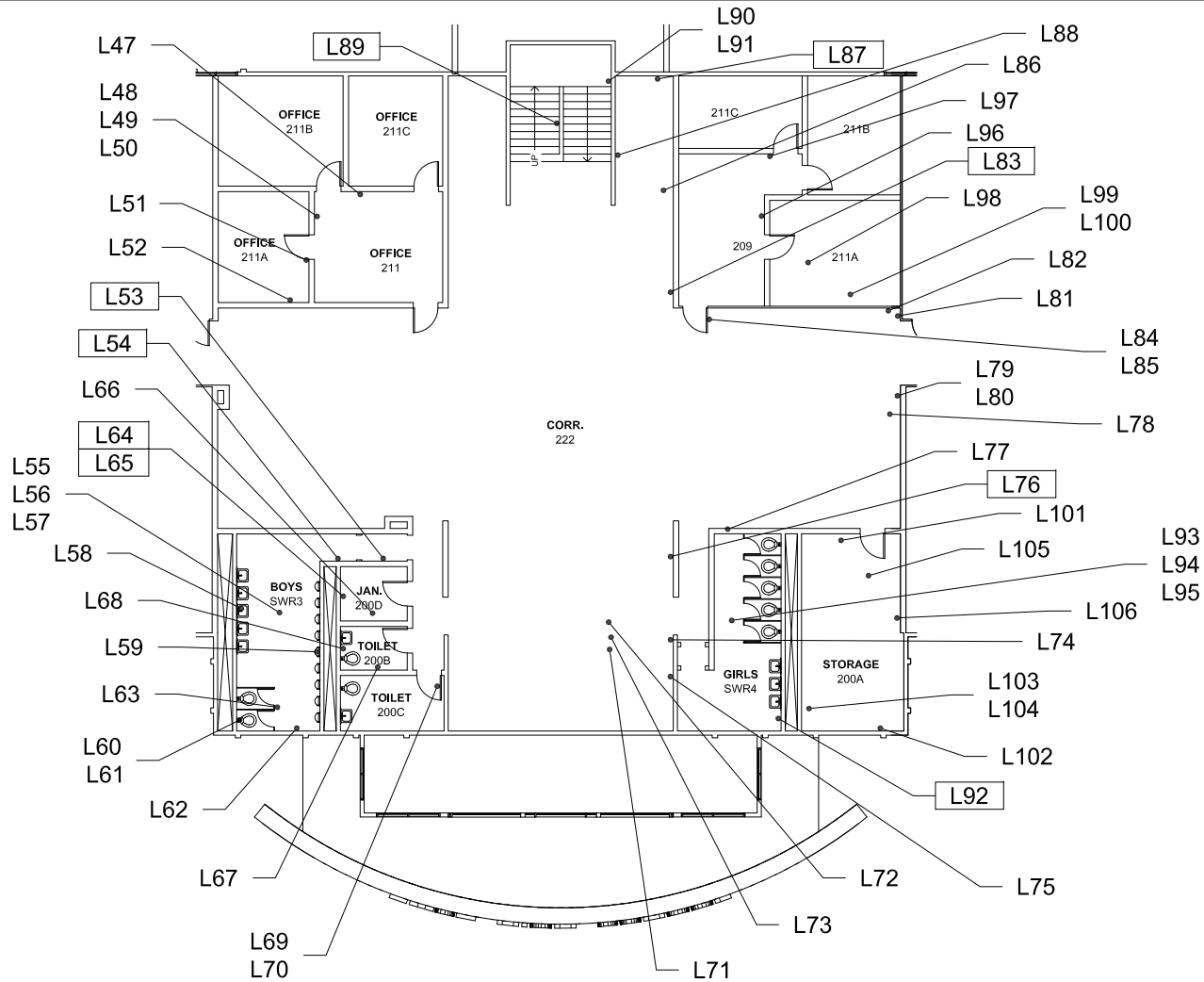
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

**ANCHORAGE
 SCHOOL
 DISTRICT**

**EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 LEAD SAMPLE LOCATIONS**



DRAWN: CTO	DATE: 04/25/2021
CHECK: RAF	DWG.NO: C-6
FILE #: 7806-SL2	



1
C-7

**BENSON BUILDING,
SECOND FLOOR, CENTRAL
NTS**

LEGEND

— LXX LEAD TEST LOCATION

— LXX LEAD TEST CONTAINING ≥ 1.0 mg/cm² OF LEAD

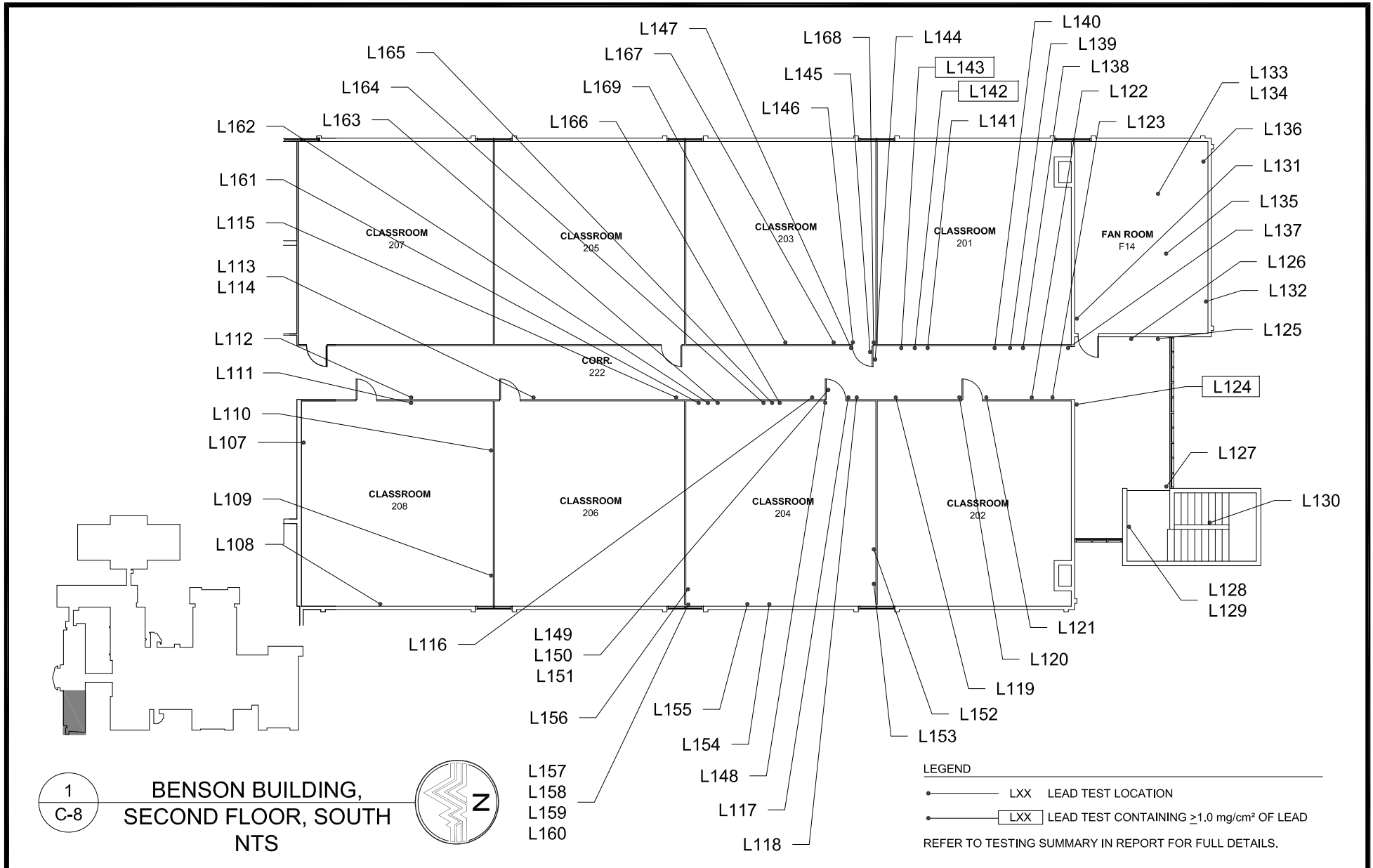
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 04/25/2021
CHECK: RAF	DWG.NO:
FILE #: 7806-SL2	C-7

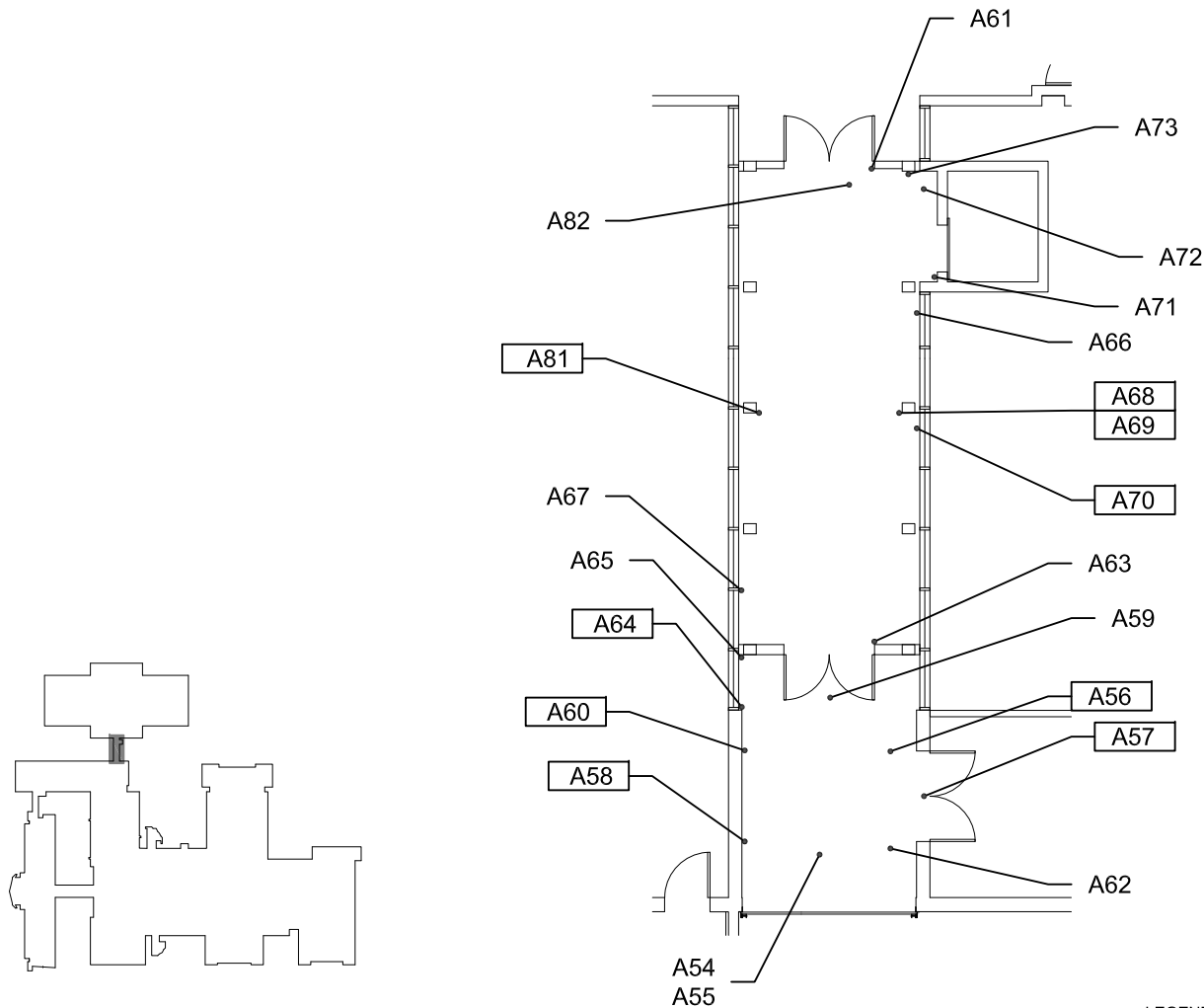


ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 04/25/2021
CHECK: RAF	DWG.NO: C-8
FILE #: 7806-SL2	



LEGEND

—●— AXX ASBESTOS TEST LOCATION

—[AXX]— LAB TEST RESULTS POSITIVE FOR ASBESTOS

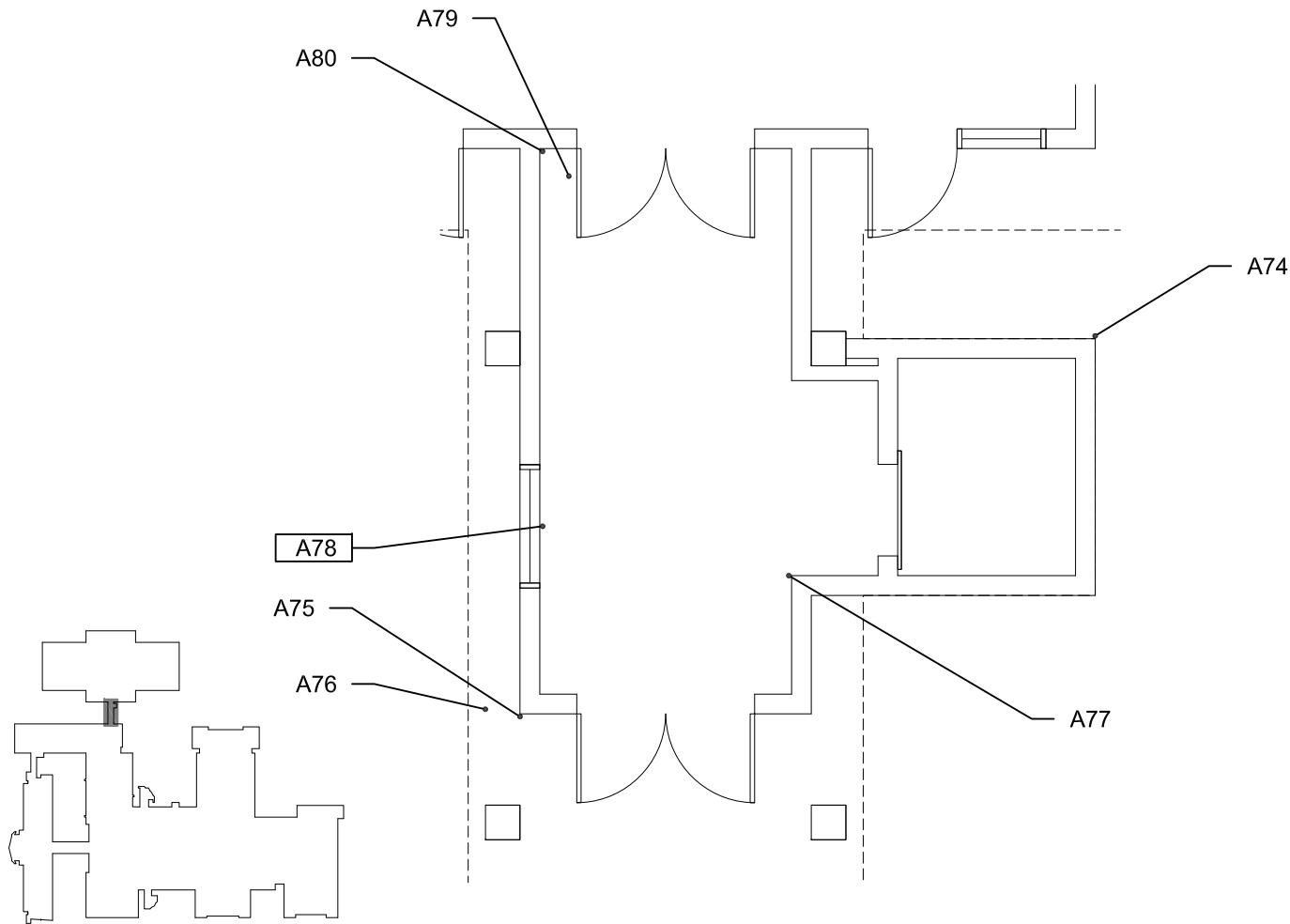
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EH1020- PREFIX.

ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS SAMPLE LOCATIONS



DRAWN: CTO	DATE: 10/28/2020
CHECK: RAF	DWG.NO:
FILE #: 7806-SL	C-1



LEGEND

- AXX ASBESTOS TEST LOCATION
- AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS

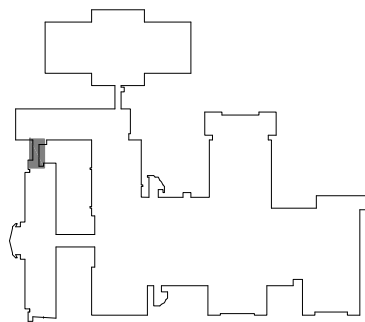
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EH1020- PREFIX.

ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS SAMPLE LOCATIONS

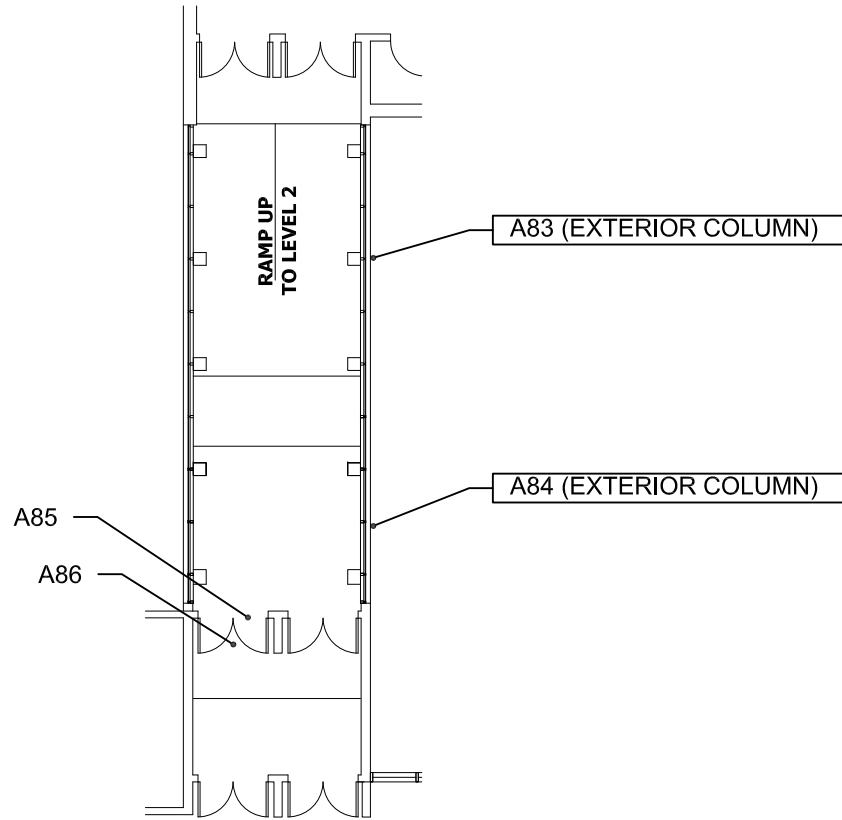


DRAWN: CTO	DATE: 10/28/2020
CHECK: RAF	DWG.NO: C-2
FILE #: 7806-SL	



1
C-3

N. BENSON BRIDGE
NTS



LEGEND

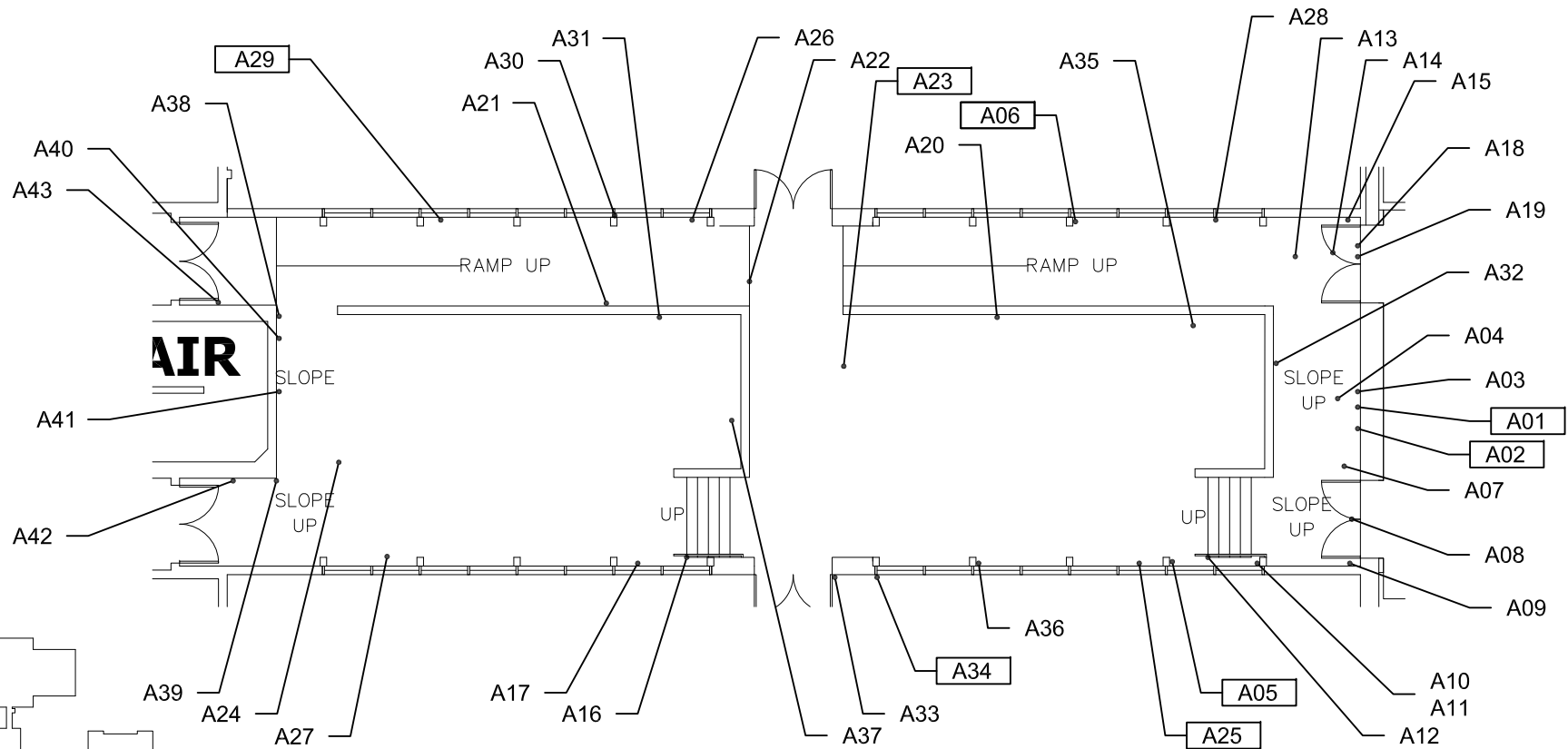
- AXX ASBESTOS TEST LOCATION
 - AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EH1020- PREFIX.

ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
ASBESTOS SAMPLE LOCATIONS



DRAWN: CTO	DATE: 10/28/2020
CHECK: RAF	DWG.NO:
FILE #: 7806-SL	C-3



LEGEND

— AXX ASBESTOS TEST LOCATION

— AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS

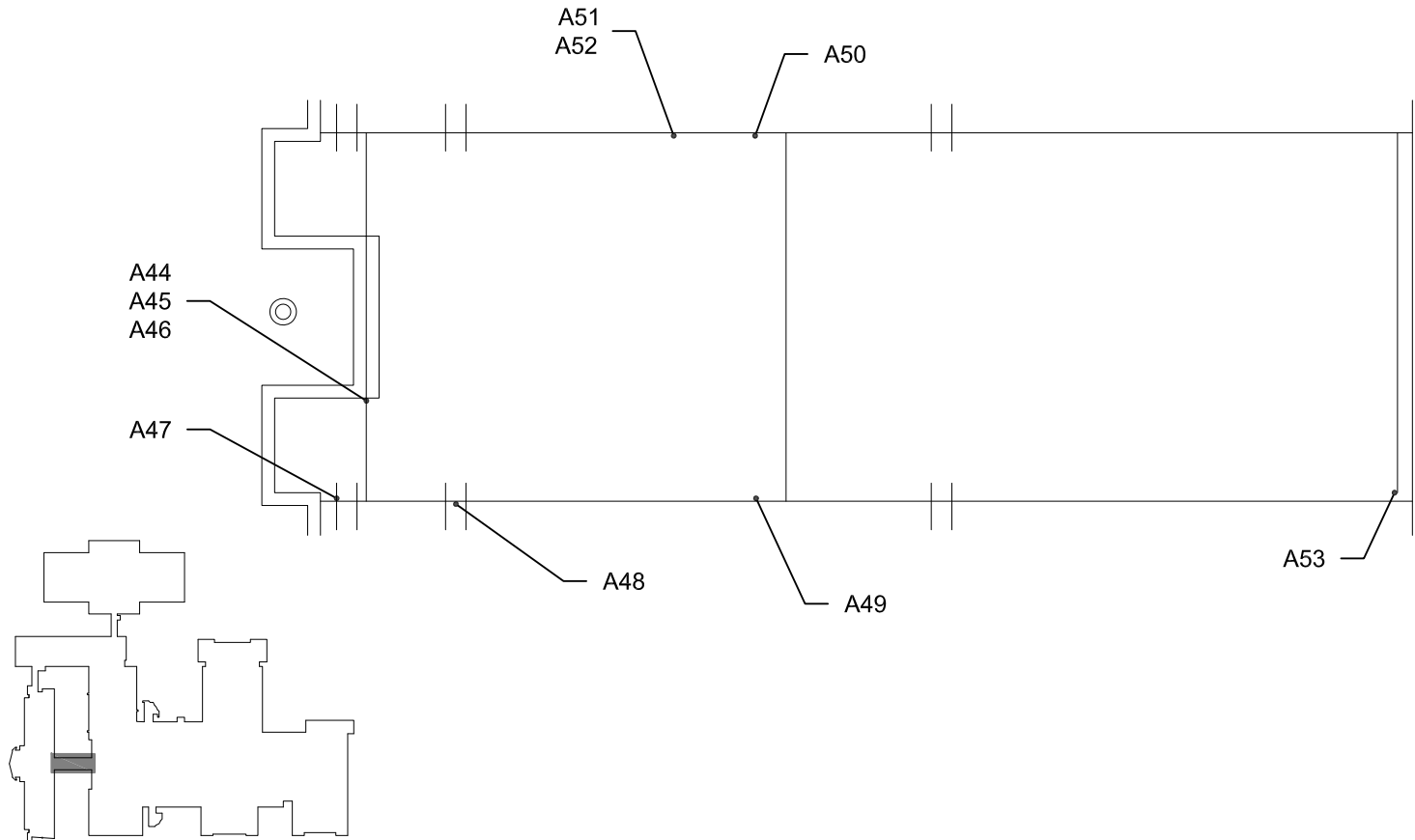
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EH1020- PREFIX.

ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS SAMPLE LOCATIONS



DRAWN: CTO	DATE: 10/28/2020
CHECK: RAF	DWG.NO:
FILE #:	C-4
7806-SL	



1
C-5

E. BENSON WALKWAY ROOF
 NTS



LEGEND

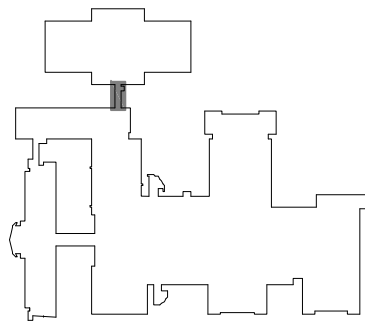
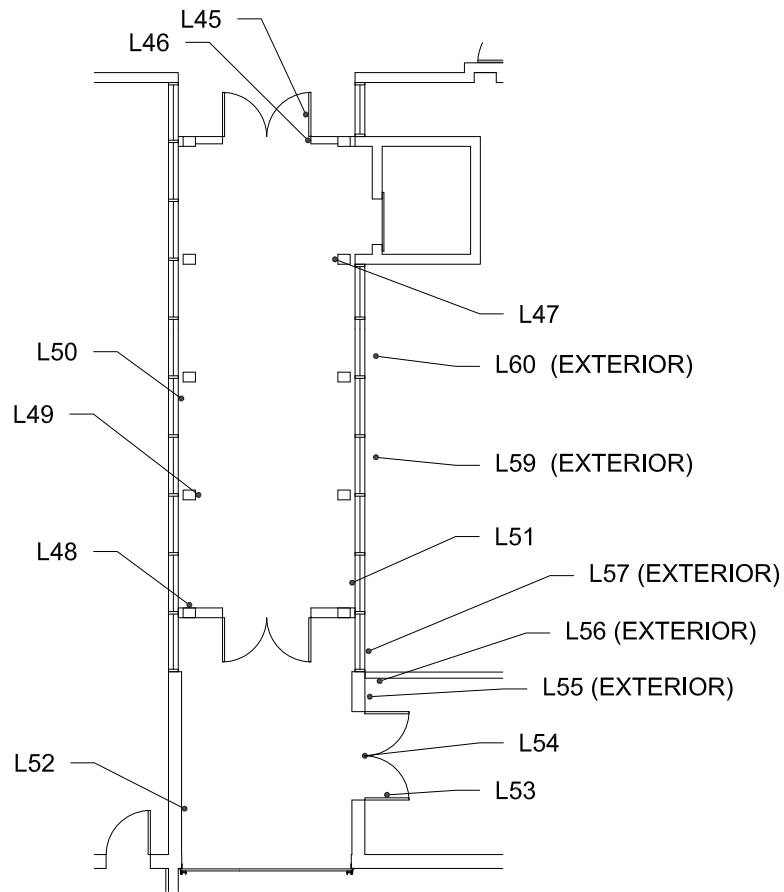
- AXX ASBESTOS TEST LOCATION
 - AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EH1020- PREFIX.

**ANCHORAGE
 SCHOOL
 DISTRICT**

**EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS SAMPLE LOCATIONS**



DRAWN: CTO	DATE: 10/28/2020
CHECK: RAF	DWG.NO:
FILE #: 7806-SL	C-5



1
C-6

GYM BRIDGE
NTS



LEGEND

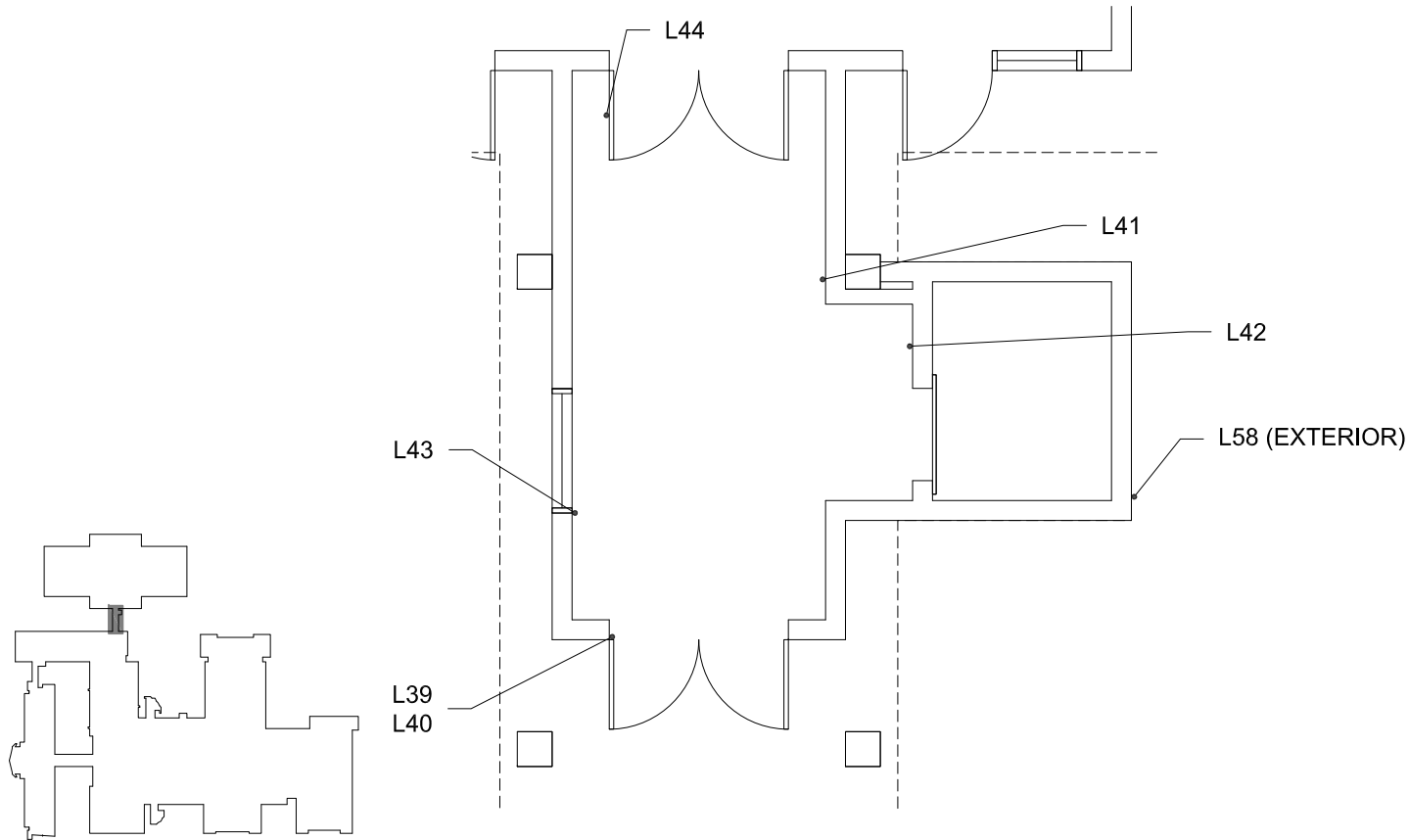
- LXX LEAD TEST LOCATION
 - LXX LEAD TEST CLASSIFIED AS LEAD BASED PAINT
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 10/28/2020
CHECK: RAF	DWG.NO: C-6
FILE #: 7806-SL	



LEGEND

- LXX LEAD TEST LOCATION
- LXX LEAD TEST CLASSIFIED AS LEAD BASED PAINT

REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

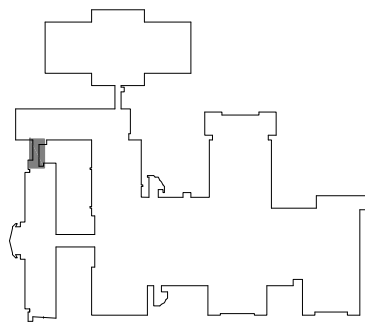
1 GYM ELEVATOR RM
 C-7 NTS

ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 LEAD SAMPLE LOCATIONS

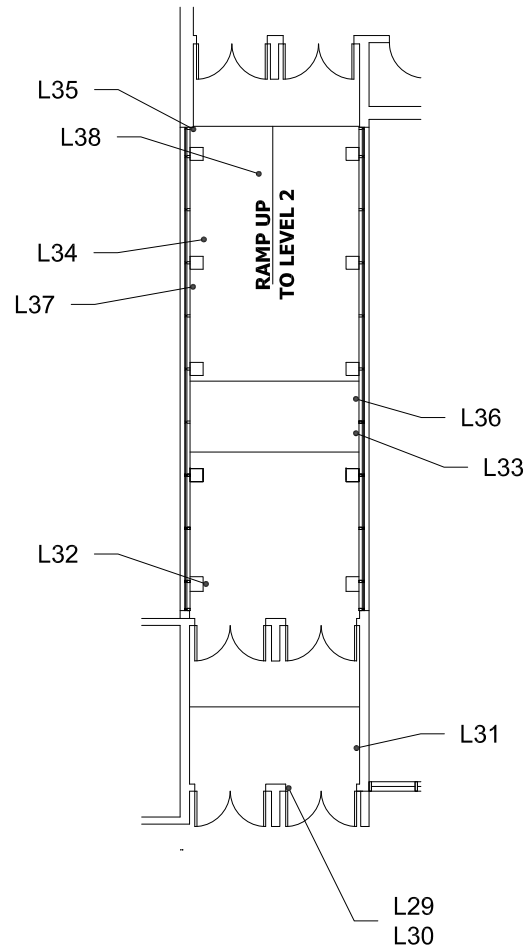


DRAWN: CTO	DATE: 10/28/2020
CHECK: RAF	DWG.NO:
FILE #:	C-7
7806-SL	



1
C-8

N. BENSON BRIDGE
NTS



LEGEND

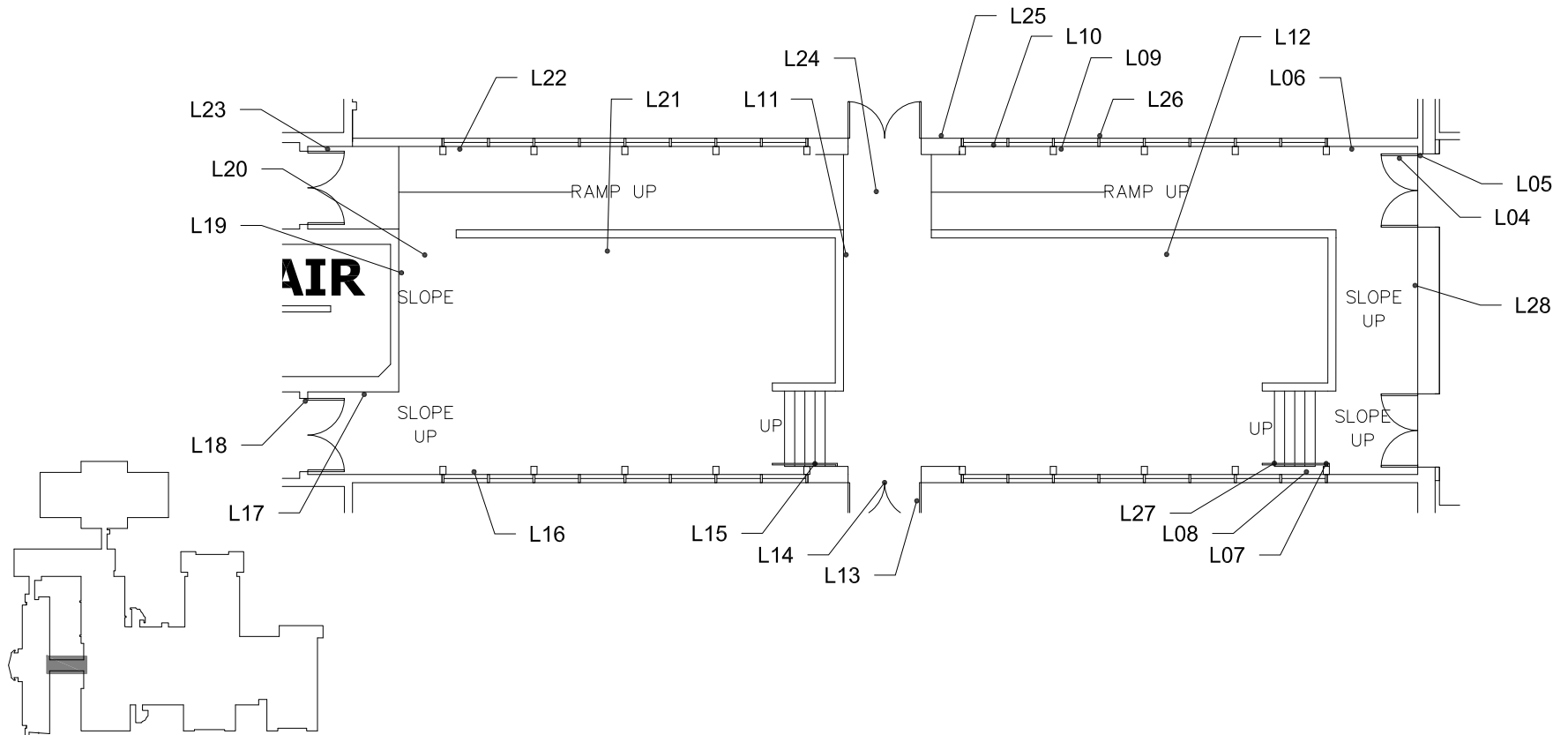
- LXX LEAD TEST LOCATION
 - LXX LEAD TEST CLASSIFIED AS LEAD BASED PAINT
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 10/28/2020
CHECK: RAF	DWG.NO: C-8
FILE #: 7806-SL	



LEGEND

- LXX LEAD TEST LOCATION
- LXX LEAD TEST CLASSIFIED AS LEAD BASED PAINT

REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

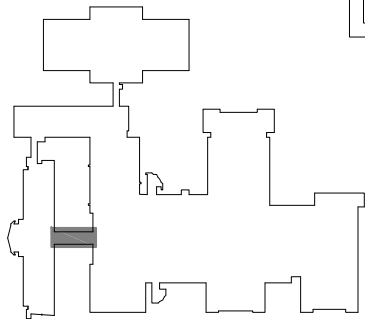
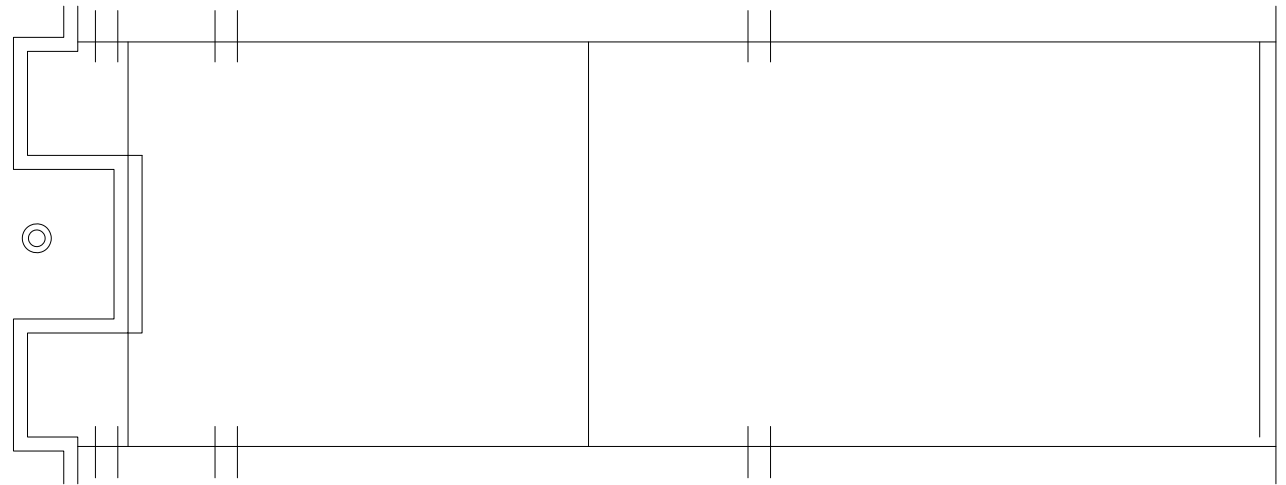
ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 10/28/2020
CHECK: RAF	DWG.NO: C-9
FILE #: 7806-SL	

NO LEAD SAMPLES
THIS SHEET



1
C-10

E. BENSON WALKWAY ROOF
 NTS



LEGEND

- LXX LEAD TEST LOCATION
- [LXX] LEAD TEST CLASSIFIED AS LEAD BASED PAINT

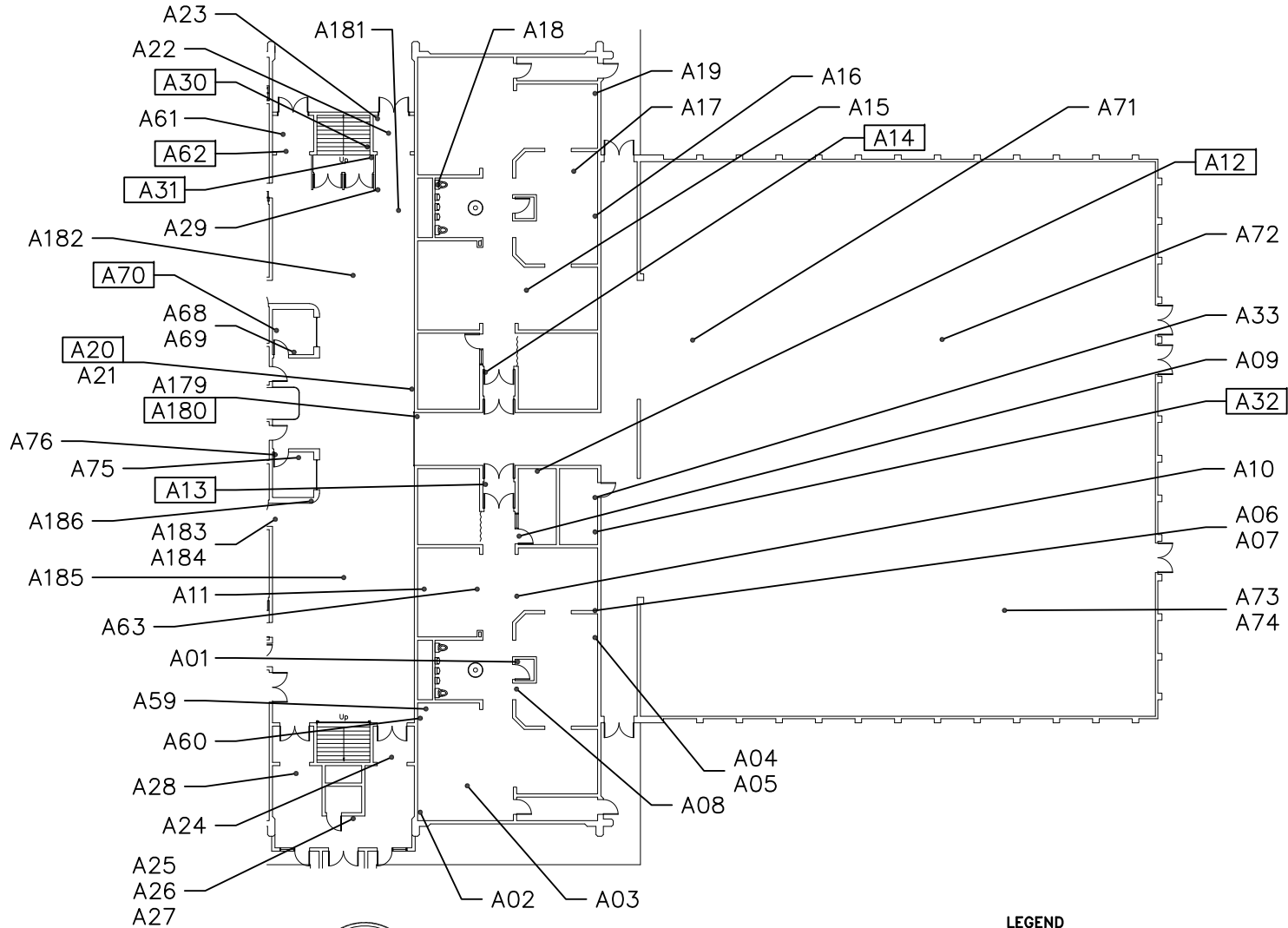
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 10/28/2020
CHECK: RAF	DWG.NO: C-10
FILE #: 7806-SL	



1
C-1

LOWER GYM AREA
NTS



LEGEND

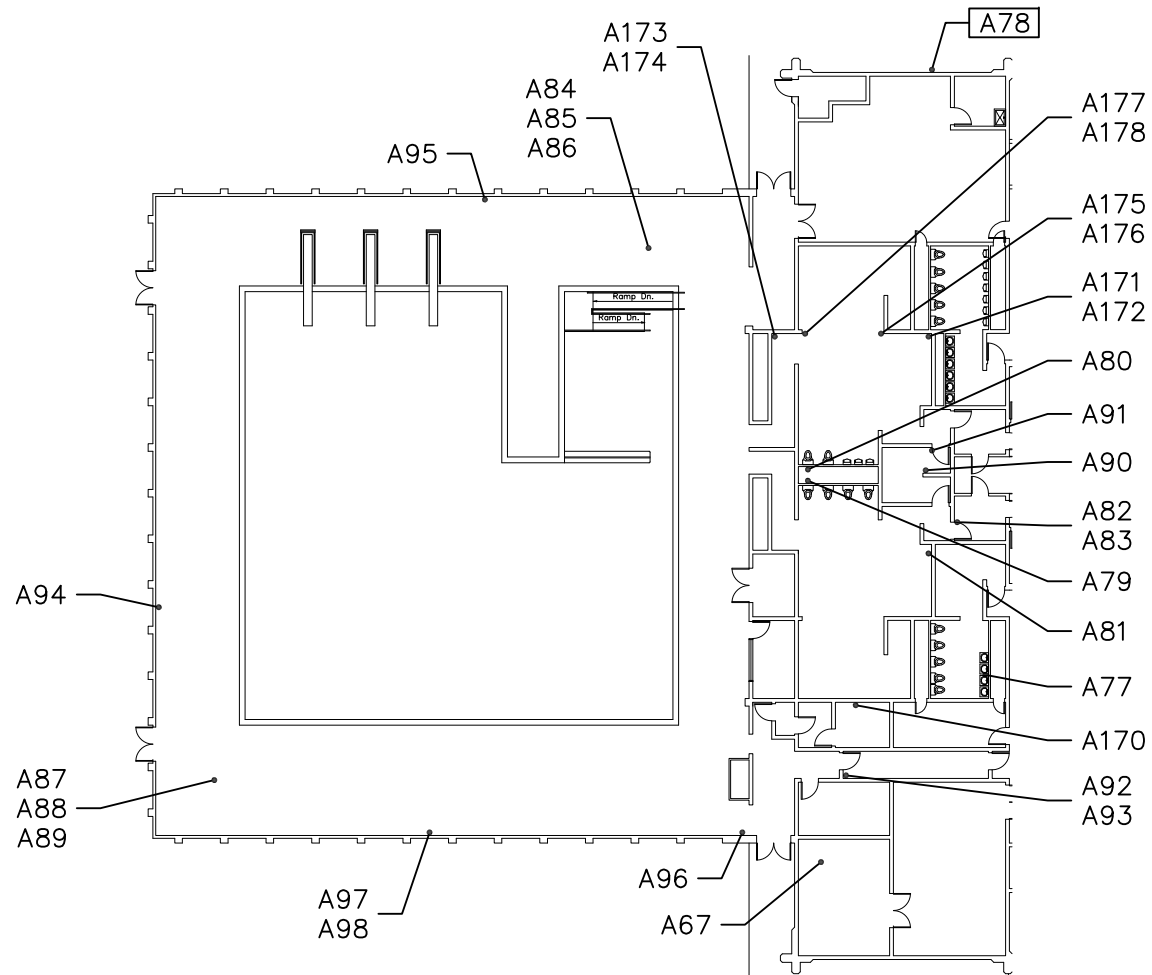
- AX — ASBESTOS TEST LOCATION
 - [AX] — LAB TEST RESULTS POSITIVE FOR ASBESTOS
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EB0918- PREFIX.

ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
ASBESTOS SAMPLE LOCATIONS



DRAWN: CTO	DATE: 09/30/2018
CHECK: RAF	DWG.NO:
FILE #: 7629-SL	C-1



LEGEND

- AXX ASBESTOS TEST LOCATION
 - A78 LAB TEST RESULTS POSITIVE FOR ASBESTOS
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EB0918- PREFIX.

1
C-2

POOL AREA
NTS



ANCHORAGE
SCHOOL
DISTRICT

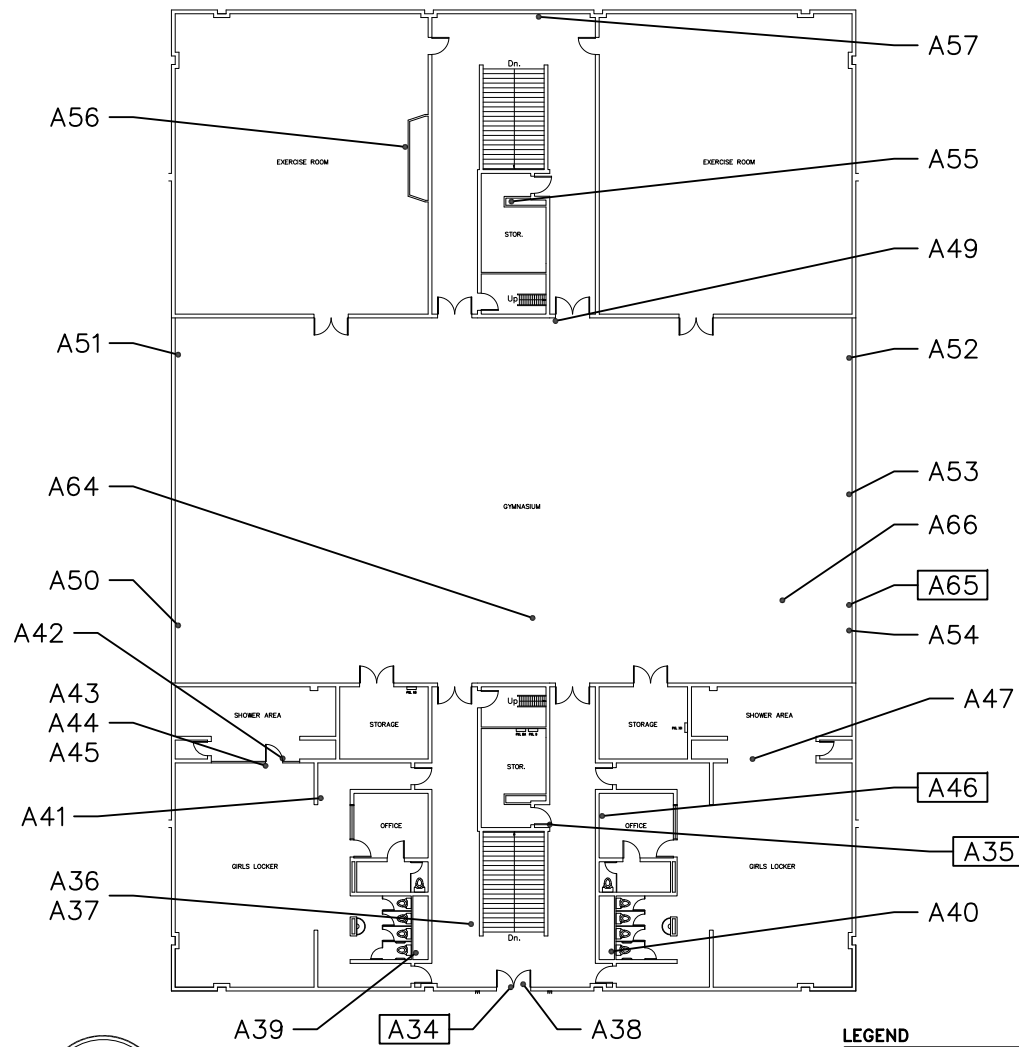
EAST HIGH SCHOOL
ANCHORAGE, ALASKA
ASBESTOS SAMPLE LOCATIONS



EHS ALASKA
INCORPORATED

ENGINEERING, HEALTH & SAFETY CONSULTANTS

DRAWN: CTO	DATE: 09/30/2018
CHECK: RAF	DWG.NO:
FILE #: 7629-SL	C-2



1
C-3

UPPER GYM AREA
NTS



LEGEND

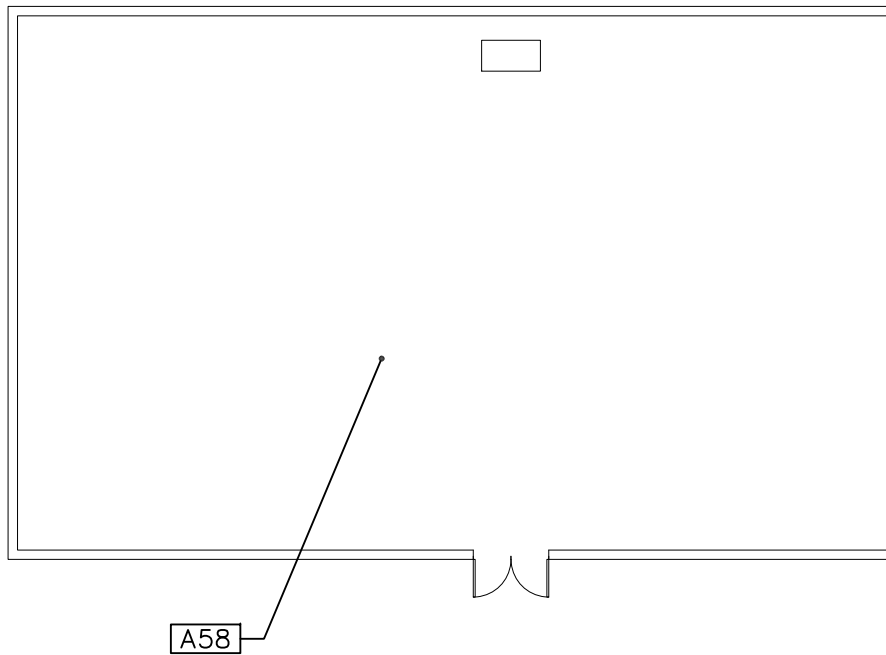
- — AXX ASBESTOS TEST LOCATION
 - — AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EB0918- PREFIX.

ANCHORAGE
SCHOOL
DISTRICT

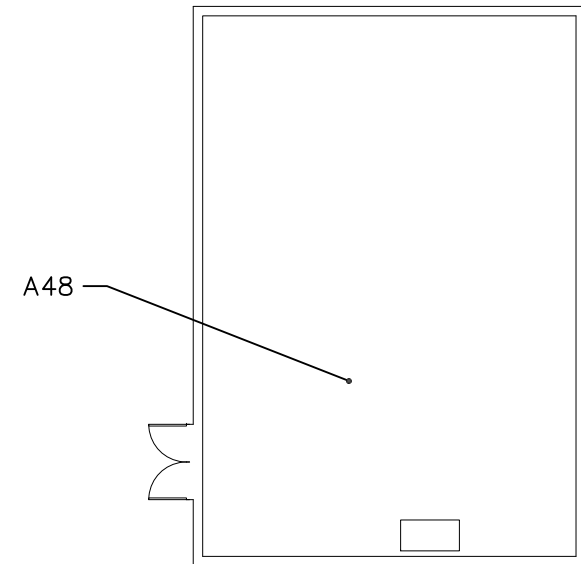
EAST HIGH SCHOOL
ANCHORAGE, ALASKA
ASBESTOS SAMPLE LOCATIONS



DRAWN: CTO	DATE: 09/30/2018
CHECK: RAF	DWG.NO:
FILE #: 7629-SL	C-3



1 SOUTH GYM FAN ROOM
 C-4 NTS



1 NORTH GYM FAN ROOM
 C-4 NTS

LEGEND

— AXX ASBESTOS TEST LOCATION

— [AXX] LAB TEST RESULTS POSITIVE FOR ASBESTOS

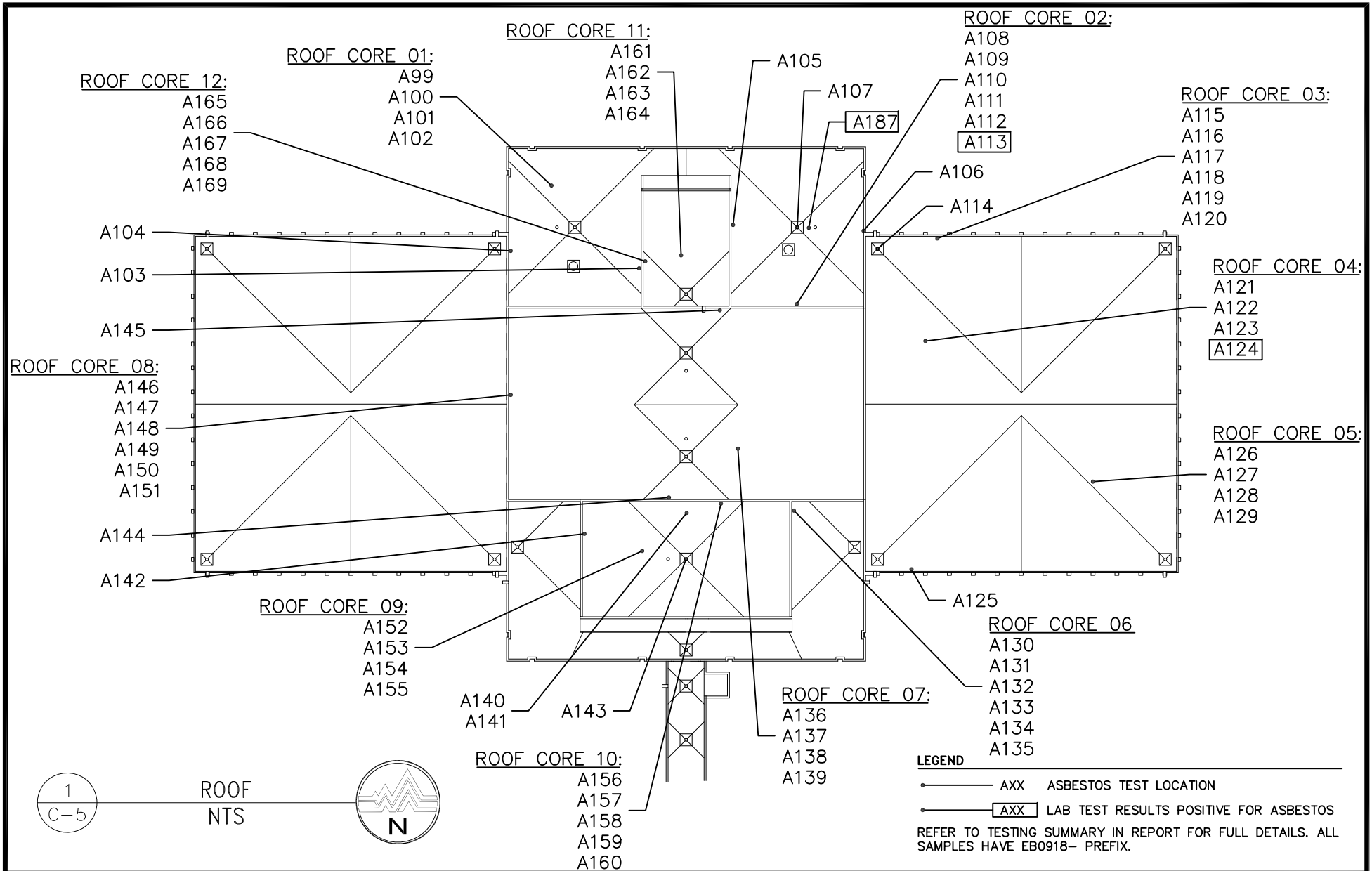
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE EB0918- PREFIX.

ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS SAMPLE LOCATIONS



DRAWN: CTO	DATE: 09/30/2018
CHECK: RAF	DWG.NO: C-4
FILE #: 7629-SL	

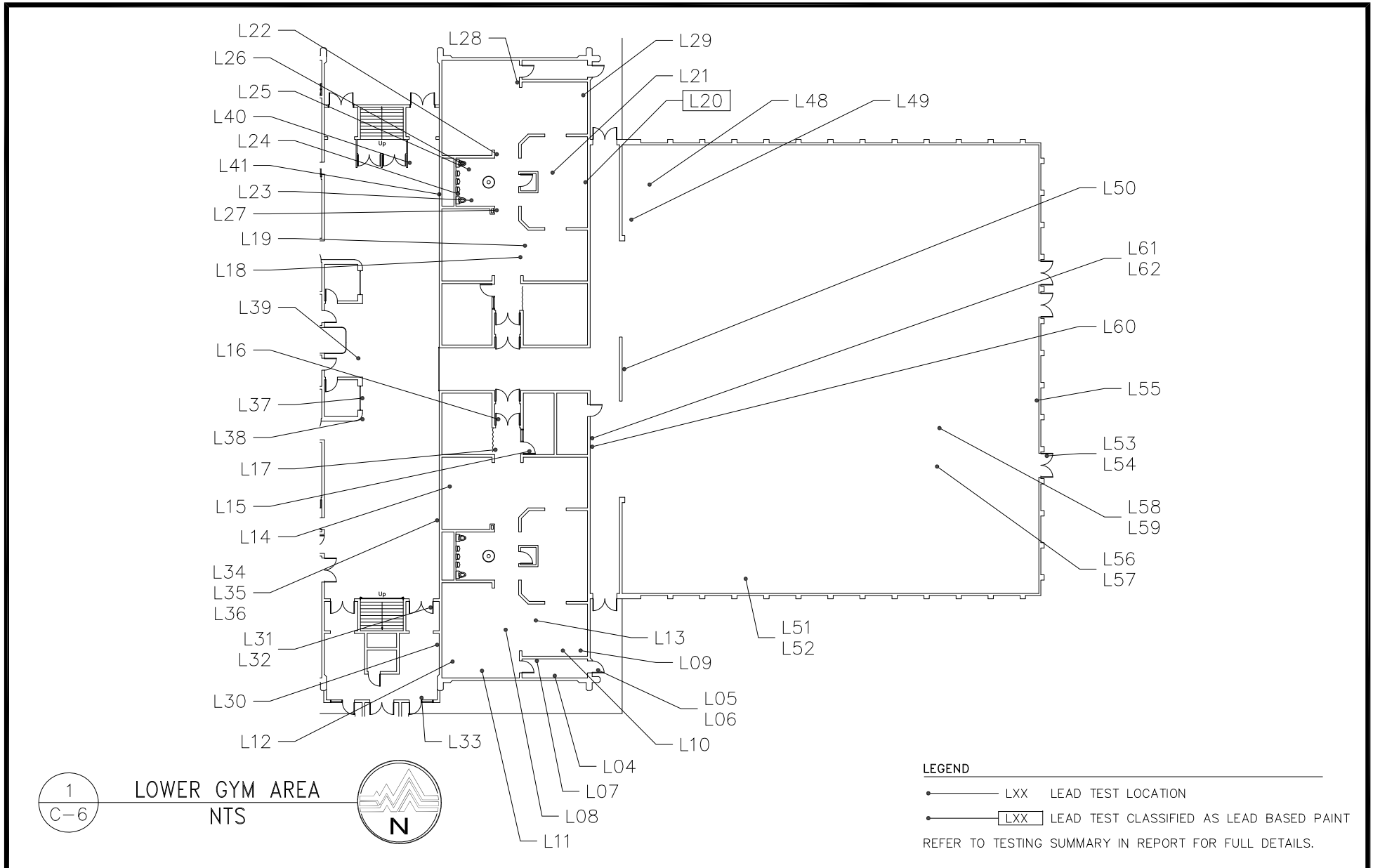


ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
ASBESTOS SAMPLE LOCATIONS



DRAWN: CTO	DATE: 09/30/2018
CHECK: RAF	DWG.NO:
FILE #: 7629-SL	C-5

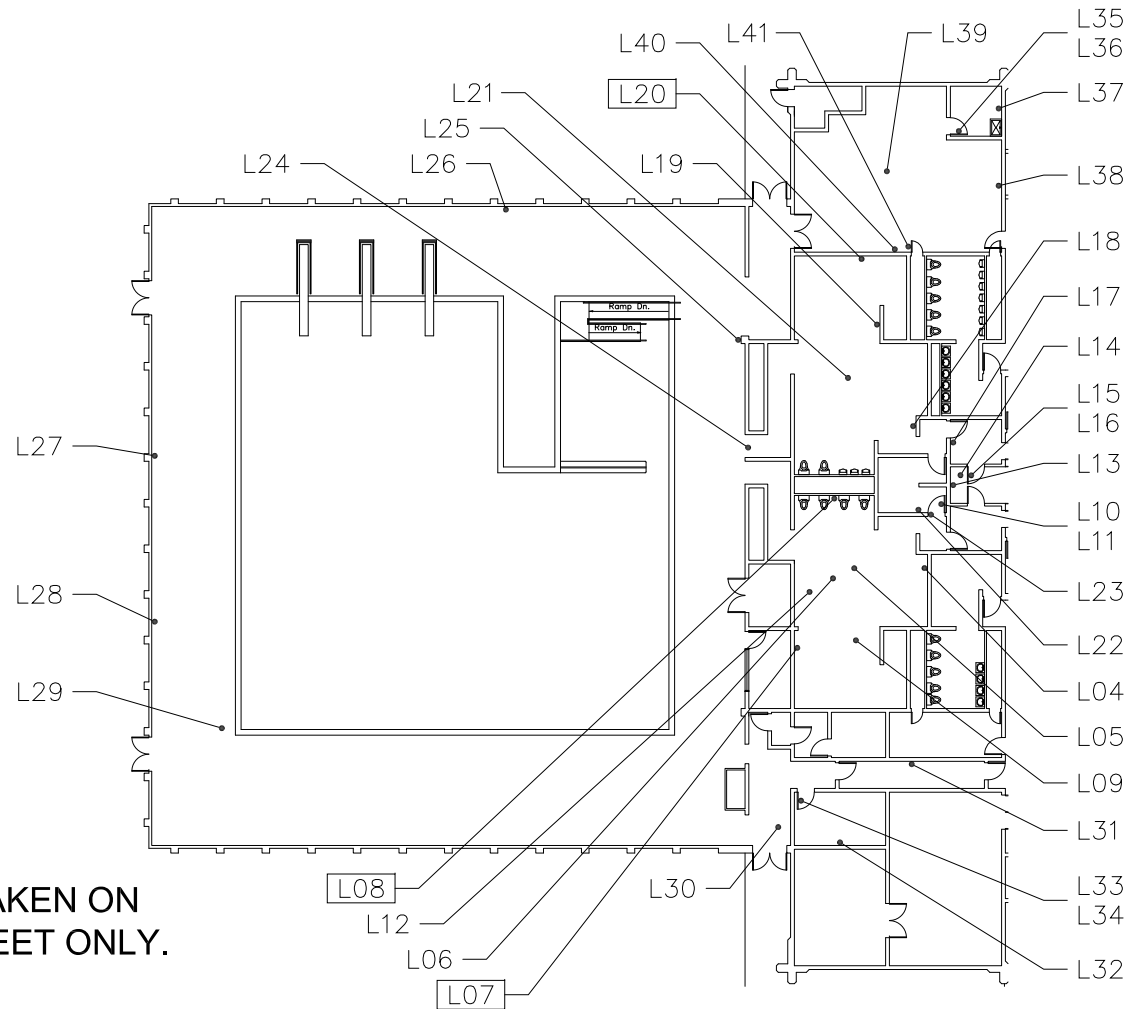


ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 09/30/2018
CHECK: RAF	DWG.NO: C-6
FILE #: 7629-SL	



LEAD SAMPLES TAKEN ON
 10/15/2018, THIS SHEET ONLY.



LEGEND

- LXX LEAD TEST LOCATION
- LXX LEAD TEST CLASSIFIED AS LEAD BASED PAINT

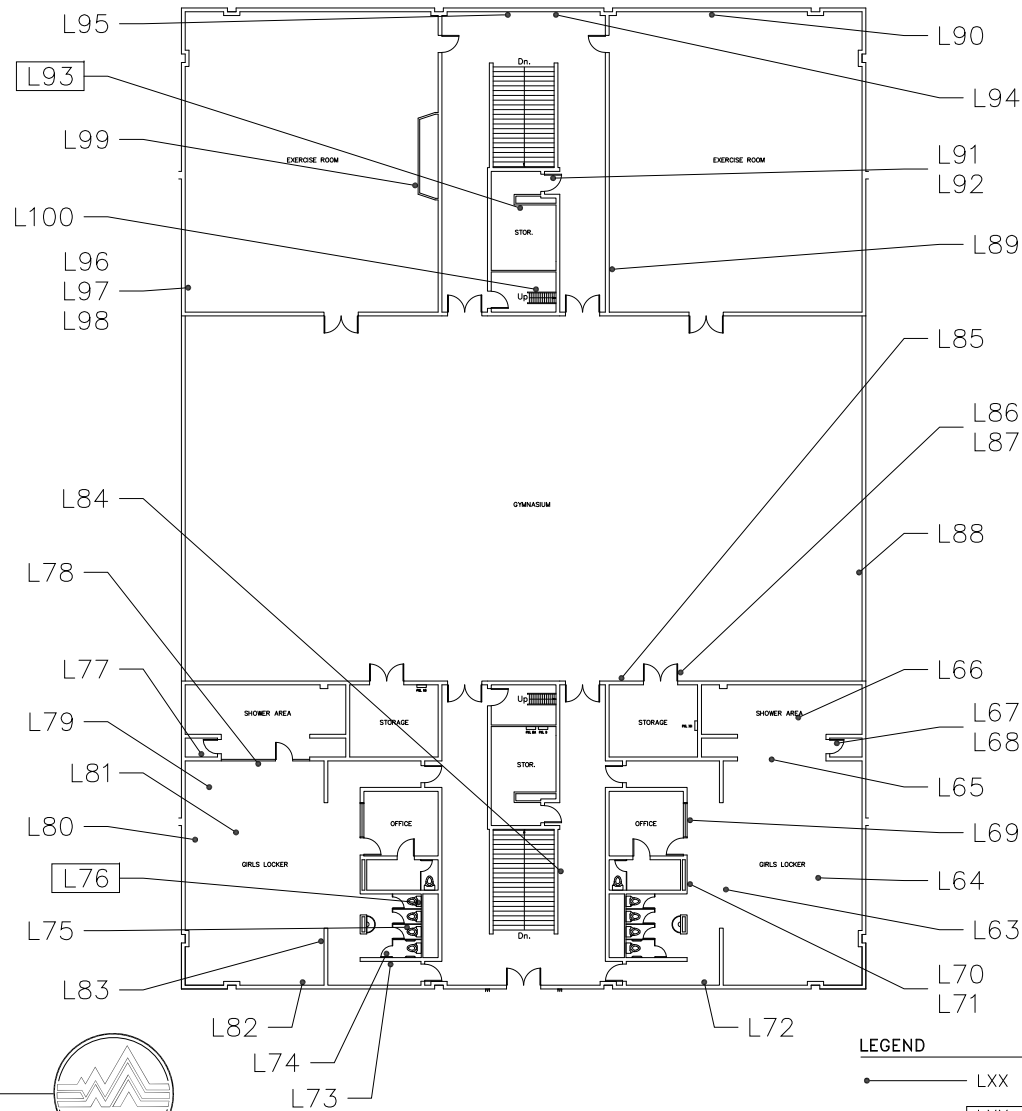
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 09/30/2018
CHECK: RAF	DWG.NO:
FILE #: 7629-SL	C-7



LEGEND

- LXX LEAD TEST LOCATION
 - LXX LEAD TEST CLASSIFIED AS LEAD BASED PAINT
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

1
C-8

UPPER GYM AREA
NTS



ANCHORAGE
SCHOOL
DISTRICT

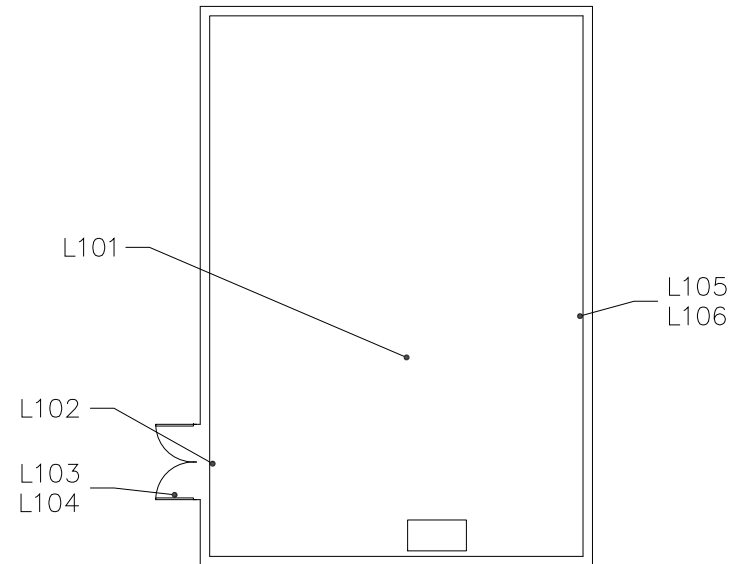
EAST HIGH SCHOOL
ANCHORAGE, ALASKA
LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 09/30/2018
CHECK: RAF	DWG.NO: C-8
FILE #: 7629-SL	



1 SOUTH GYM FAN ROOM
 C-9 NTS



1 NORTH GYM FAN ROOM
 C-9 NTS

LEGEND

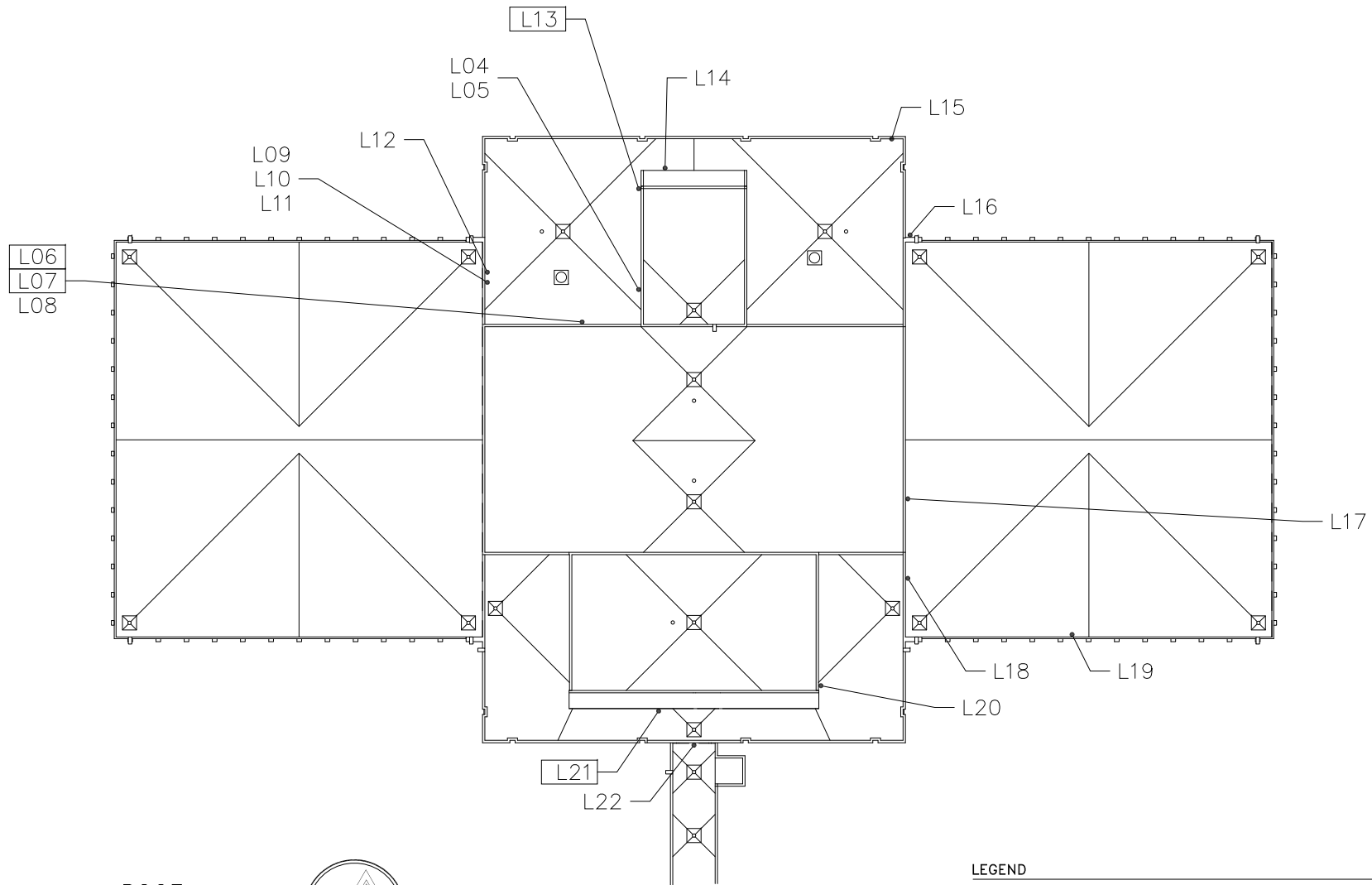
- LXX LEAD TEST LOCATION
 - LXX LEAD TEST CLASSIFIED AS LEAD BASED PAINT
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 09/30/2018
CHECK: RAF	DWG.NO: C-9
FILE #: 7629-SL	



1
C-10

ROOF
NTS



LEGEND

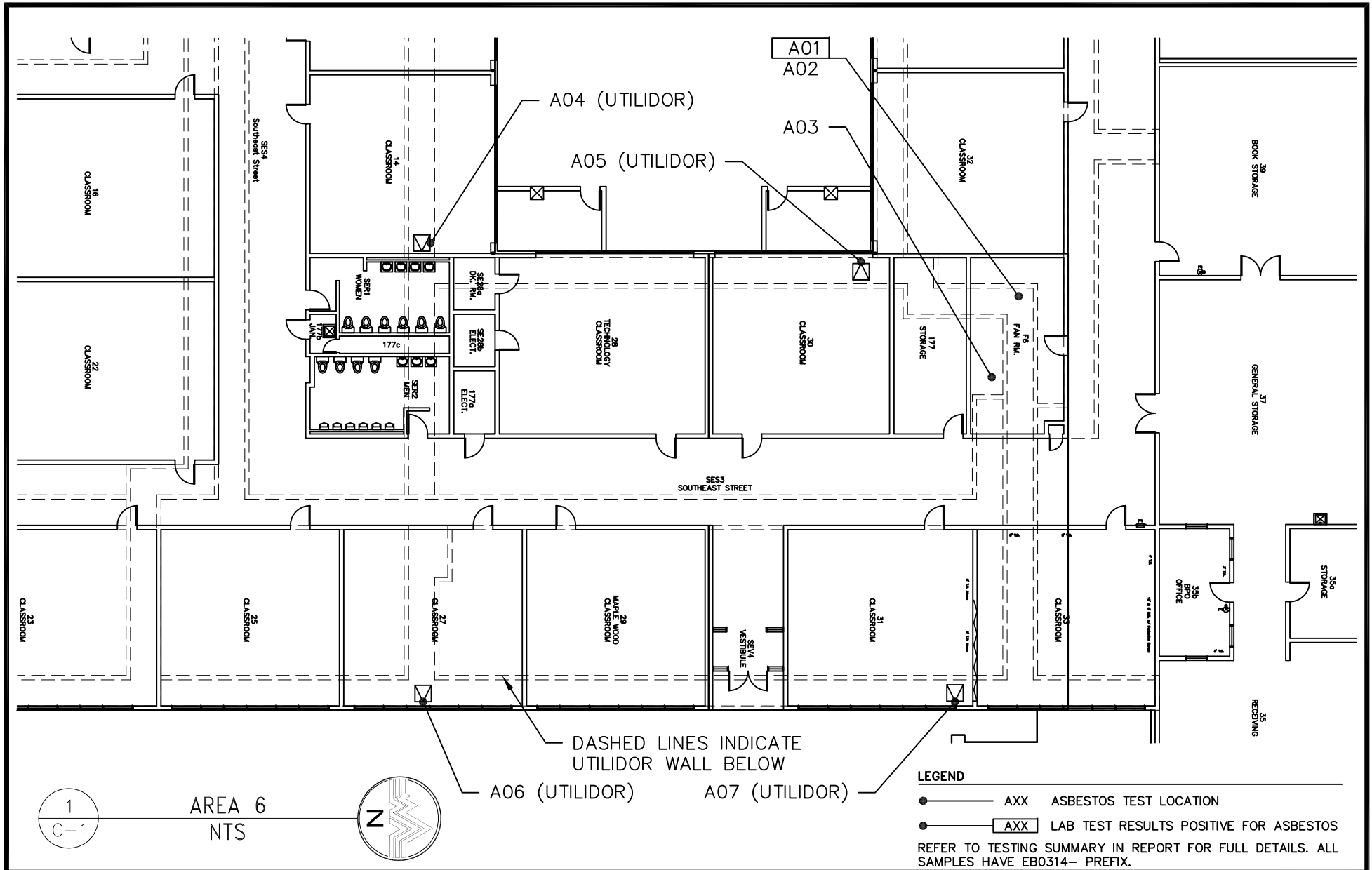
- LXX LEAD TEST LOCATION
 - LXX LEAD TEST CLASSIFIED AS LEAD BASED PAINT
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 09/30/2018
CHECK: RAF	DWG.NO: C-10
FILE #: 7629-SL	

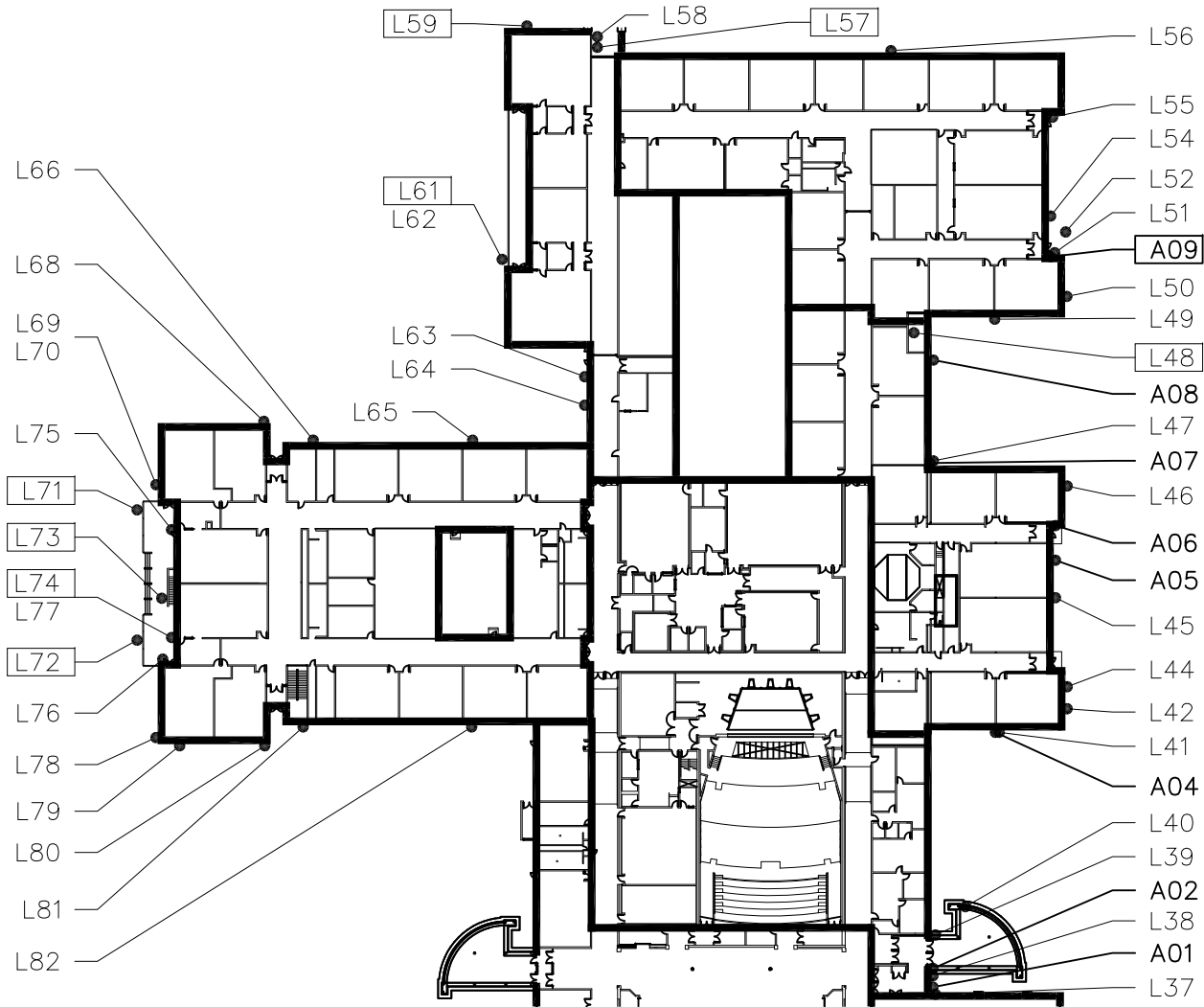


ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
ASBESTOS SAMPLE LOCATIONS



DRAWN: CTO	DATE: 03/14/2014
CHECK: RAF	DWG.NO:
FILE #: 7281-SL	C-1



LEGEND

- — LXX LEAD TEST LOCATION
- — LXX LEAD TEST CLASSIFIED AS LEAD-BASED PAINT

REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.



1
C-2
MAIN FLOOR
NTS

LEGEND

- — AXX ASBESTOS TEST LOCATION
- — AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS

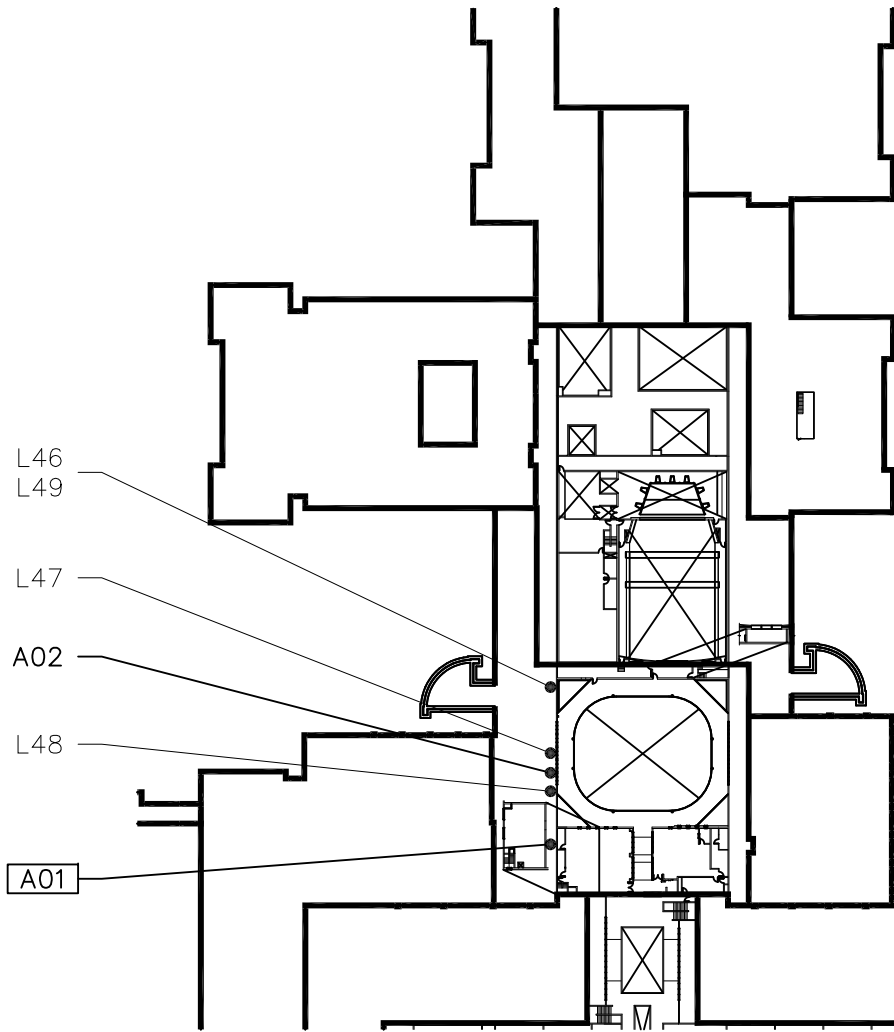
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.
ALL SAMPLES HAVE EB-0512- PREFIX.

ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
ASBESTOS & LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 06/01/2012
CHECK: RAF	DWG.NO:
FILE #:	C-2
7107-SL	



LEGEND

- — LXX LEAD TEST LOCATION
- — [LXX] LEAD TEST CLASSIFIED AS LEAD-BASED PAINT

REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.



LEGEND

- — AXX ASBESTOS TEST LOCATION
- — [AXX] LAB TEST RESULTS POSITIVE FOR ASBESTOS

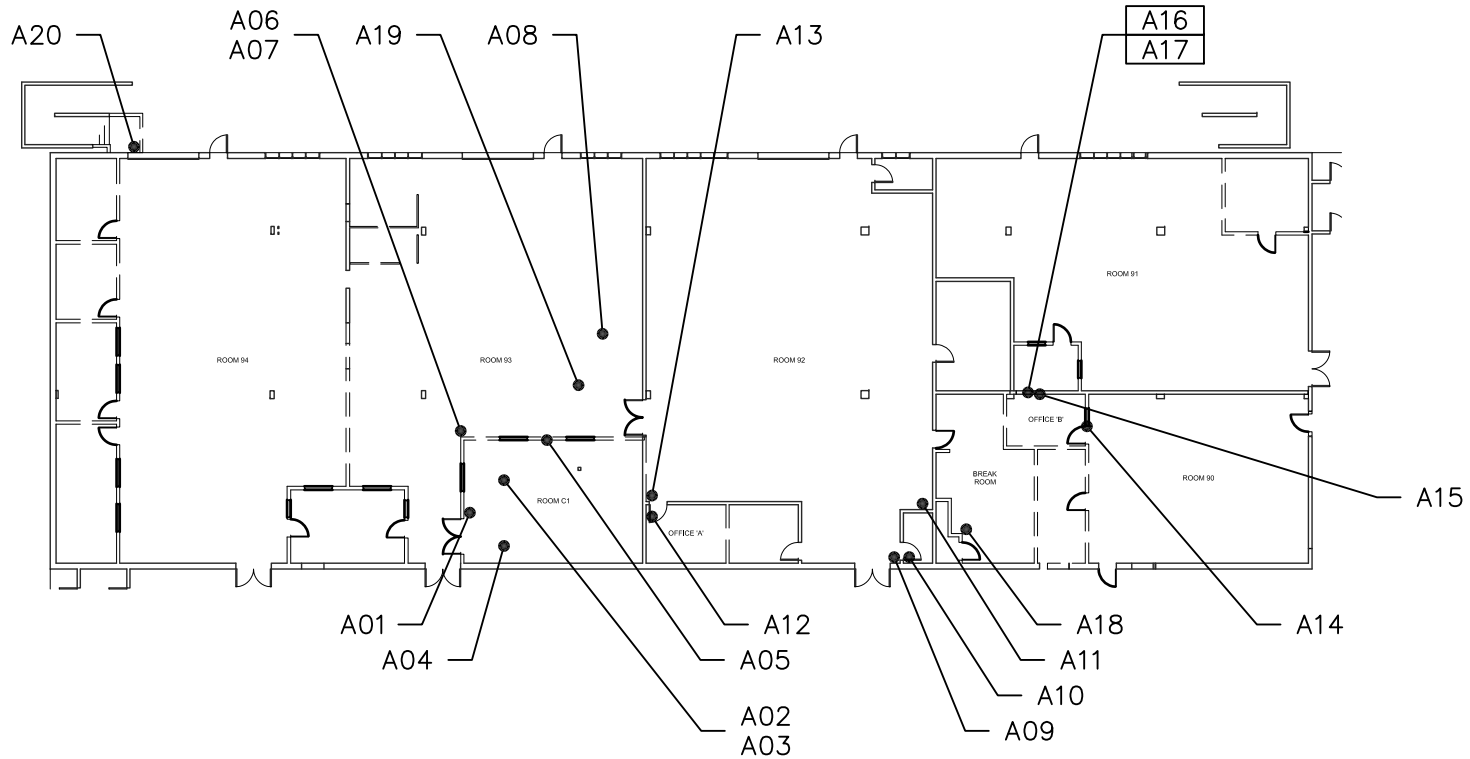
REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.
 ALL SAMPLES HAVE EB-0612- PREFIX.

ANCHORAGE
 SCHOOL
 DISTRICT

EAST HIGH SCHOOL
 ANCHORAGE, ALASKA
 ASBESTOS & LEAD SAMPLE LOCATIONS



DRAWN: CTO	DATE: 06/01/2012
CHECK: RAF	DWG.NO:
FILE #: 7107-SL	C-3



1
C-1

FLOOR PLAN
NTS



LEGEND

- — AXX ASBESTOS TEST LOCATION
- — [AXX] LAB TEST RESULTS POSITIVE FOR ASBESTOS

REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.
 ALL SAMPLES HAVE EHS0112- PREFIX.

ANCHORAGE
SCHOOL
DISTRICT

EAST HIGH SCHOOL
ANCHORAGE, ALASKA
ASBESTOS SAMPLE LOCATION



DRAWN: CTO	DATE: 01/06/2012
CHECK: RAF	DWG.NO:
FILE #: 7045-SL	C-1

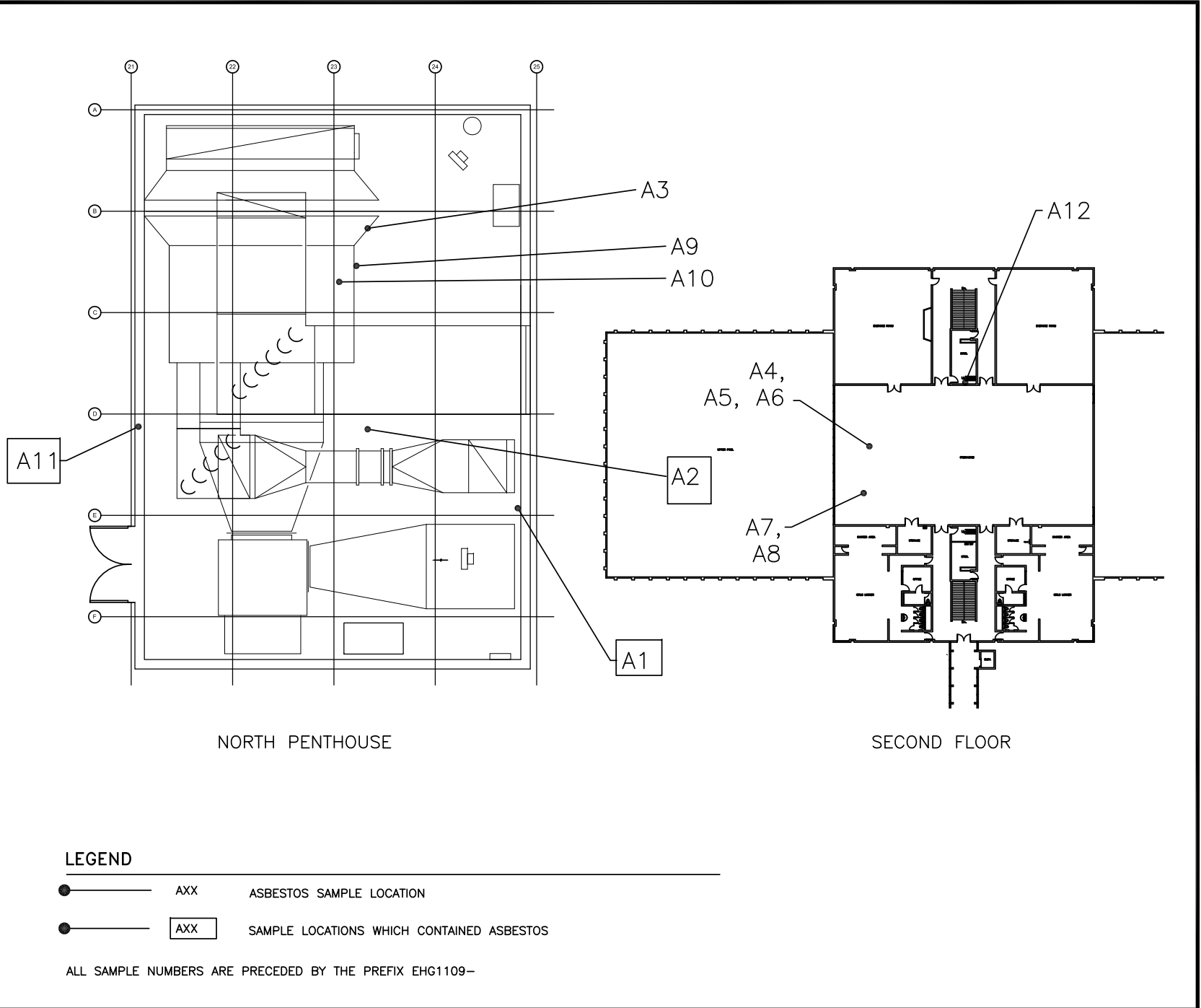



ANCHORAGE SCHOOL DISTRICT
 INSPECTED BY EHS-ALASKA, INC.
 INSPECTOR: ROBERT FRENCH
 PHONE # 694-1383

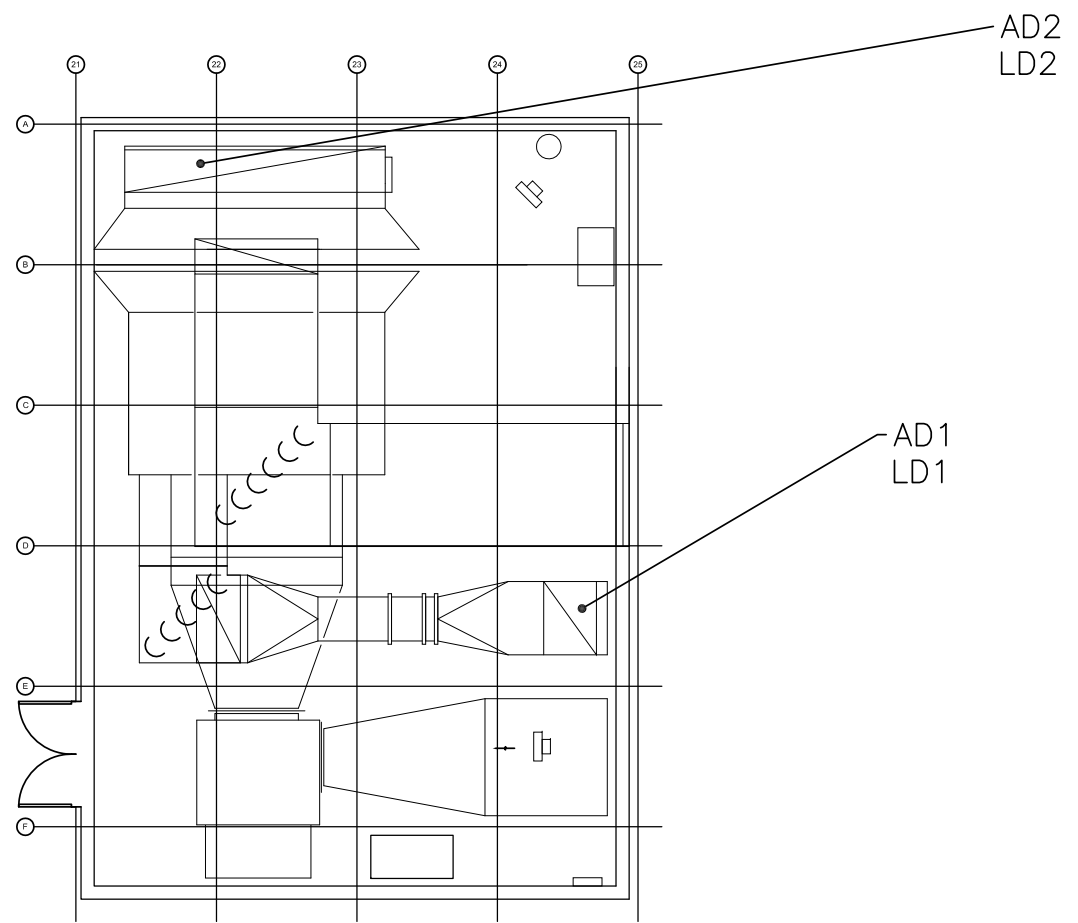
EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

ASD East HS North Gym Fond Rm. HVAC
 ASBESTOS SAMPLE LOCATIONS
 INSPECTED: 11/4/09
 CADD FILE: 6855-SL

SHEET NO.
 1
 OF
 2



 <p>ANCHORAGE SCHOOL DISTRICT</p>	<p>ANCHORAGE SCHOOL DISTRICT INSPECTED BY: EHS-ALASKA, INC. INSPECTOR: ROBERT FRENCH PHONE #: 694-1383</p>	<p>EAST ANCHORAGE HIGH 4025 E. NORTHERN LIGHTS ANCHORAGE, ALASKA</p>	<p>ASD East HS North Gym Fond Rm. HVAC DUST SAMPLE LOCATIONS INSPECTED: 11/4/09 CADD FILE: 6855-SL</p>	<p>SHEET NO. 2 OF 2</p>
--	---	--	---	--



NORTH PENTHOUSE

LEGEND

- — ADXX ASBESTOS DUST SAMPLE LOCATION
- — LDXX LEAD DUST SAMPLE LOCATION

ALL SAMPLE NUMBERS ARE PRECEDED BY THE PREFIX EHG1109-

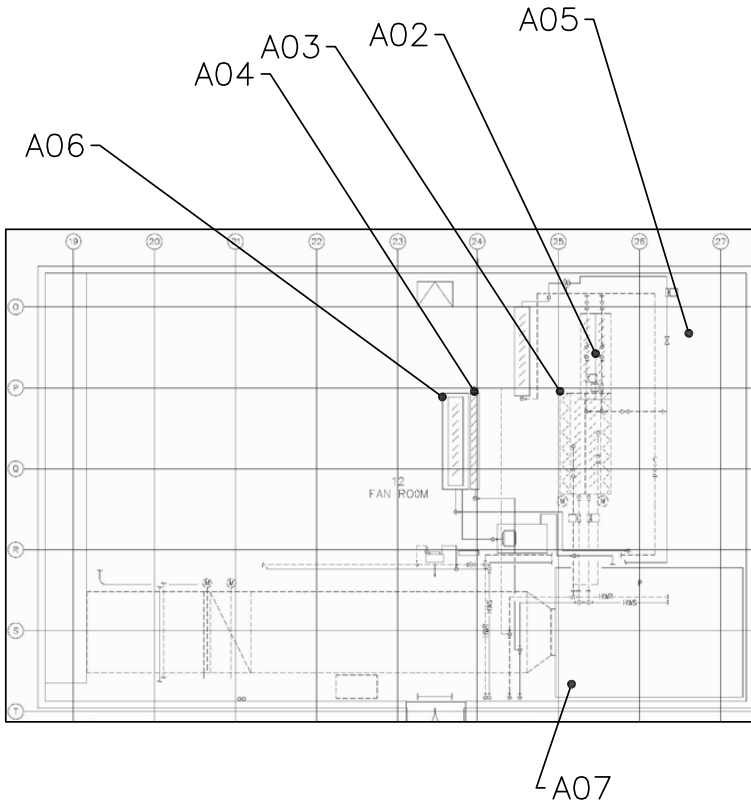


ANCHORAGE SCHOOL DISTRICT
 INSPECTED BY EHS-ALASKA, INC.
 INSPECTOR: ROBERT A. FRENCH
 PHONE # 694-1383

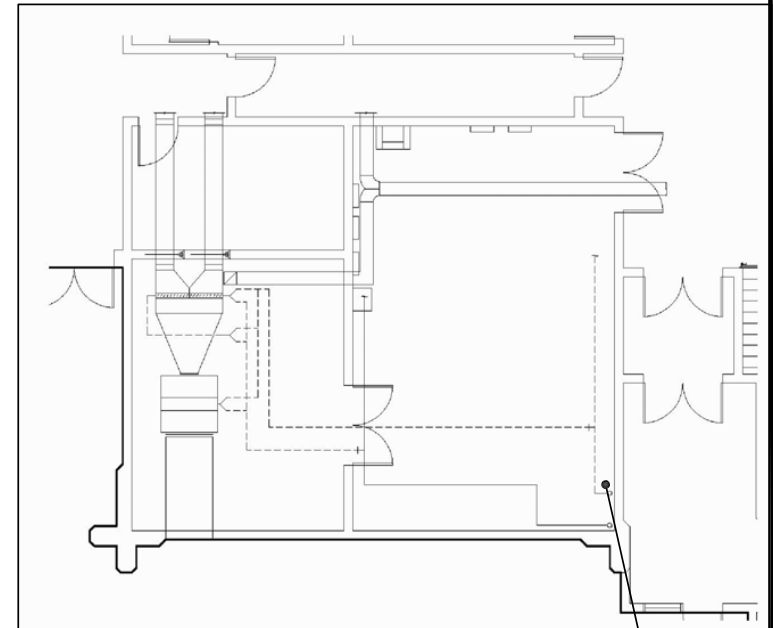
EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

ASD East HS Heating Coil Replacement
 ASBESTOS SAMPLE LOCATIONS
 INSPECTED: 4/20/00
 OADD FILE: 6787-SL

SHEET NO.
 1
 OF
 1



PENTHOUSE



FIRST FLOOR

LEGEND

- — AXX ASBESTOS SAMPLE LOCATION
- — [AXX] SAMPLE LOCATIONS WHICH CONTAINED ASBESTOS

ALL SAMPLE NUMBERS ARE PRECEDED BY THE PREFIX EAST42009-

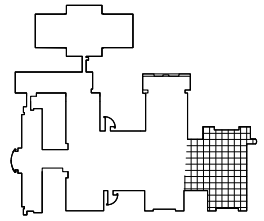


EHS ALASKA
INCORPORATED
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11901 Business Blvd, Suite 200, Eagle River, AK 99577-7701
PH: 907-694-1383 FAX: 907-694-1382

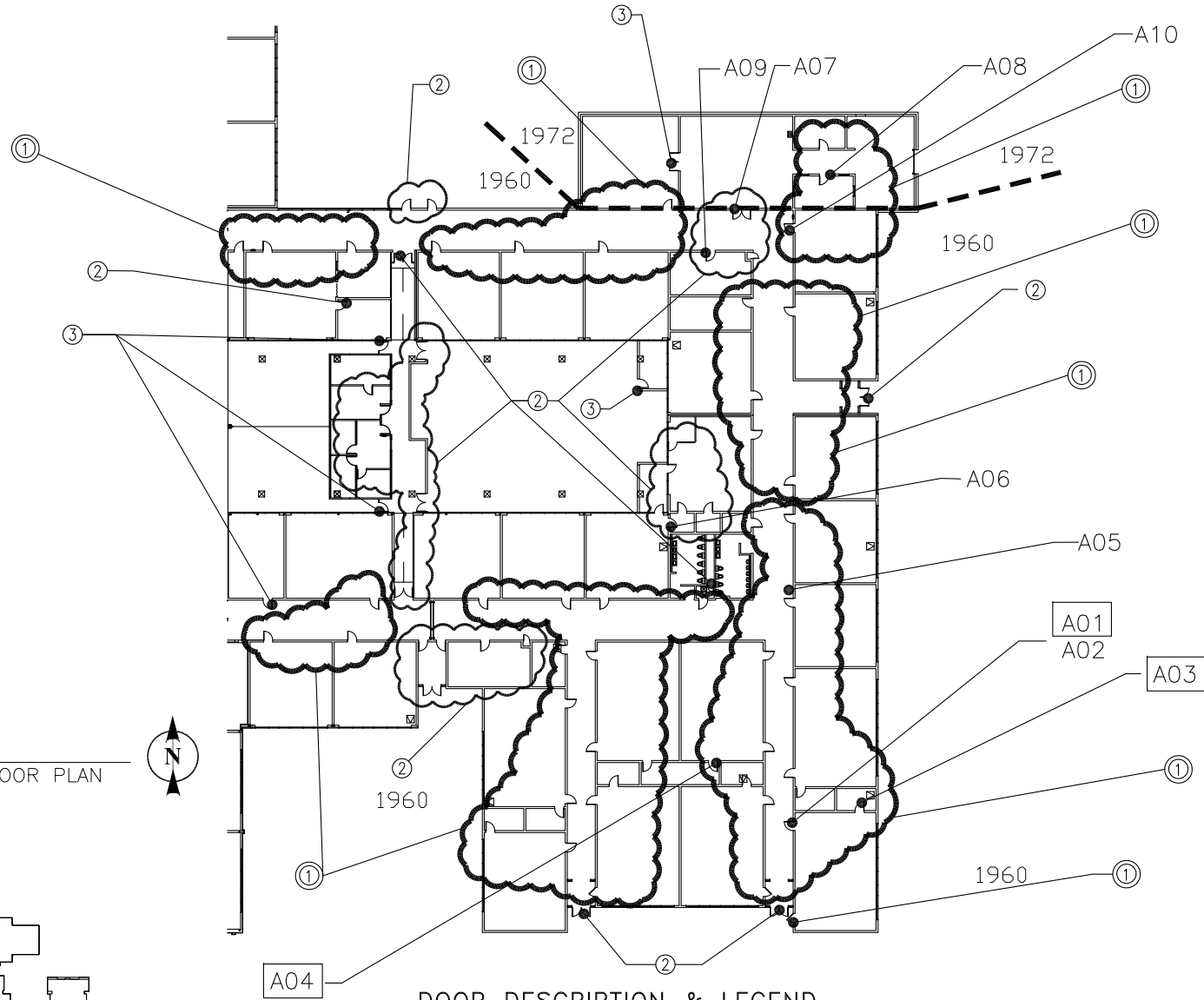
ANCHORAGE SCHOOL DISTRICT
EAST HIGH SCHOOL
SECURITY HARDWARE UPGDS
SAMPLE & DOOR LOCATIONS

DESIGNED: BJZ	PROJECT NO. 6884-01
DRAWN: BJZ	JOB No. 6884-01
CHECKED: RAF	DWG. TITLE: JULY 28-30, 2008
SCALE: N.T.S.	of 6 B1

LEVEL 1
PARTIAL FLOOR PLAN




KEY PLAN



DOOR DESCRIPTION & LEGEND

- ① WOOD DOOR WITH ACM INSULATION
- ② METAL DOOR WITH OR WITHOUT MANUFACTURER LABEL WITH NON-ACM INSULATION
- ③ WOOD DOOR WITH NON-ACM INSULATION

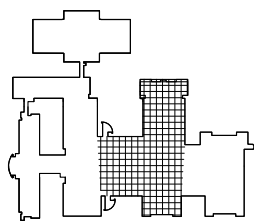
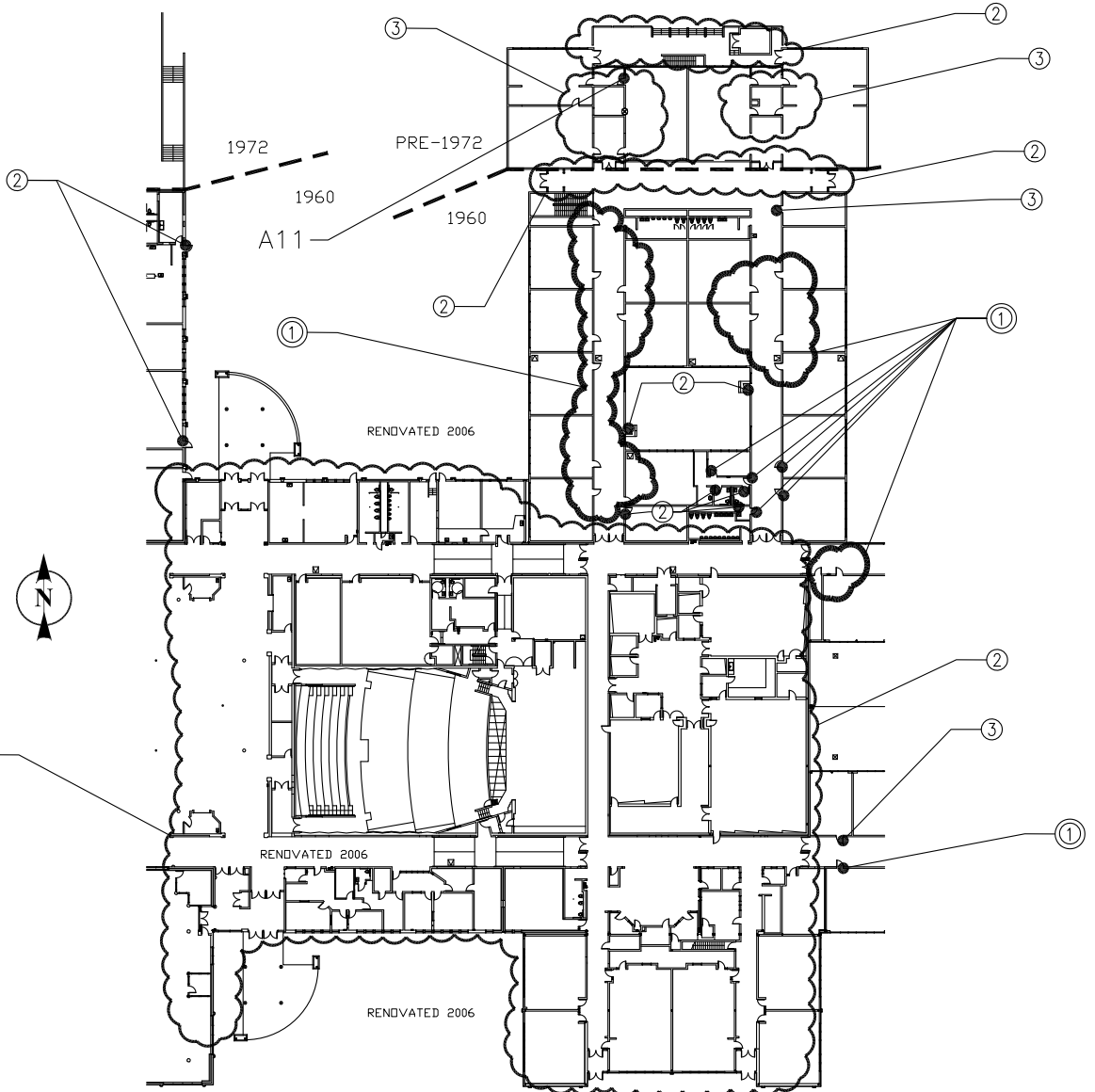
- — AXX ASBESTOS TEST LOCATION
 - — [AXX] LAB TEST RESULTS POSITIVE FOR ASBESTOS
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.
SAMPLES HAVE EHS-0708- PREFIX UNLESS OTHERWISE NOTED.
-  HATCHING INDICATES AREAS NOT INVESTIGATED THIS SURVEY

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 PH: 907-684-1383 FAX: 907-684-1382

ANCHORAGE SCHOOL DISTRICT
 EAST HIGH SCHOOL
 SECURITY HARDWARE UPGDS
 SAMPLE & DOOR LOCATIONS

DESIGNED: BJZ	PROJECT NO. 6884-01
DRAWN: BJZ	JWF: 28-30, 2008
CHECKED: RAF	B2
SCALE: N.T.S.	of 6

LEVEL 1
 PARTIAL FLOOR PLAN



KEY PLAN

DOOR DESCRIPTION & LEGEND

- ① WOOD DOOR WITH ACM INSULATION
- ② METAL DOOR WITH OR WITHOUT MANUFACTURER LABEL WITH NON-ACM INSULATION
- ③ WOOD DOOR WITH NON-ACM INSULATION

- — AXX ASBESTOS TEST LOCATION
- — AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. SAMPLES HAVE EHS0708- PREFIX UNLESS OTHERWISE NOTED.
- ▨ HATCHING INDICATES AREAS NOT INVESTIGATED THIS SURVEY

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 INCORPORATED
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 PH: 907-684-1383 FAX: 907-684-1382

ANCHORAGE SCHOOL DISTRICT
 EAST HIGH SCHOOL
 SECURITY HARDWARE UPGDS
 SAMPLE & DOOR LOCATIONS

DESIGNED:	BJZ
DRAWN:	BJZ
CHECKED:	RAF

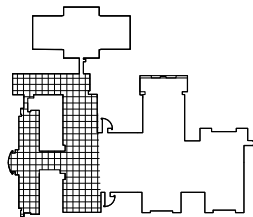
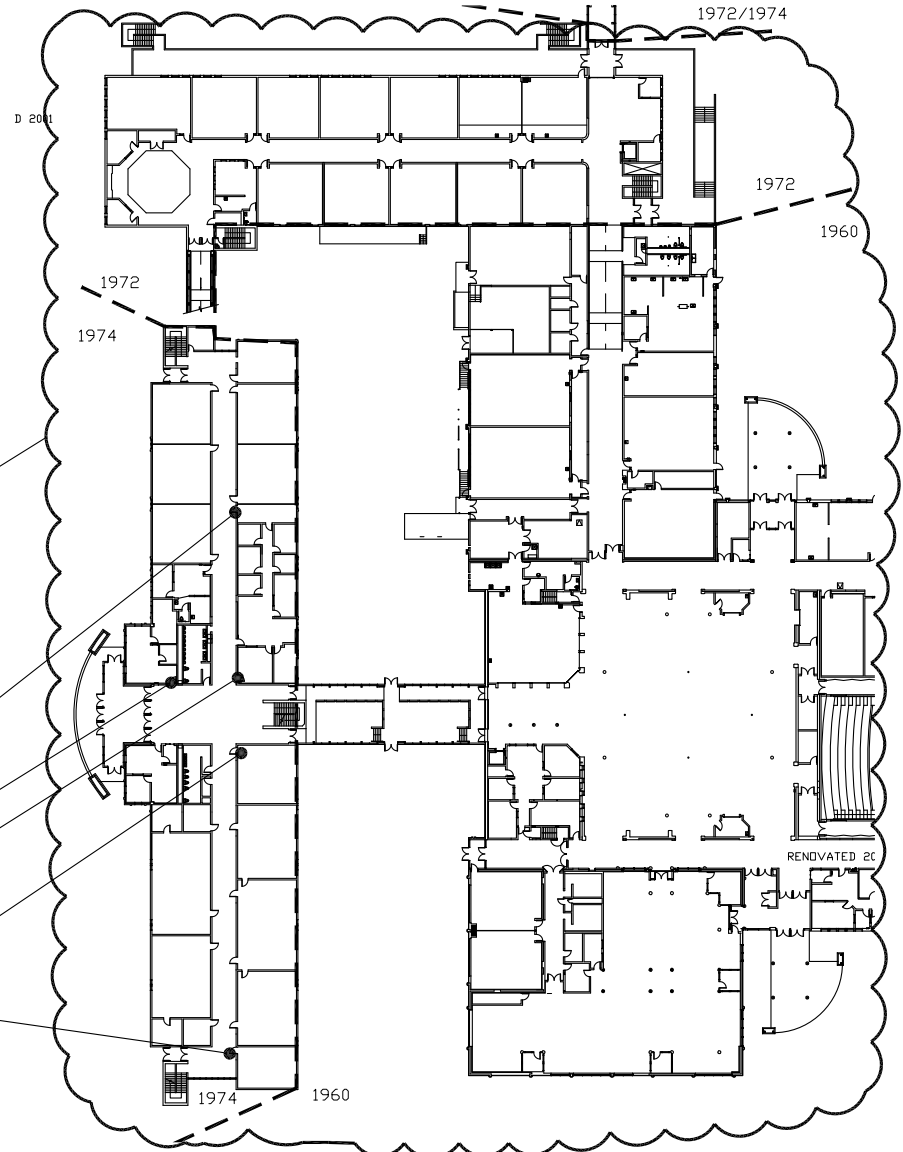
PROJECT NO.:	
DWG. TITLE:	
SCALE:	N.T.S.

JOB No.	6884-01
DATE:	JULY 28-30, 2008
of	6
	B3

LEVEL 1
 PARTIAL FLOOR PLAN



EB802-A6
 EB802-A5
 EB802-A3
 EB1105-A35
 A13



KEY PLAN

DOOR DESCRIPTION & LEGEND

- ① WOOD DOOR WITH ACM INSULATION
- ② METAL DOOR WITH OR WITHOUT MANUFACTURER LABEL WITH NON-ACM INSULATION
- ③ WOOD DOOR WITH NON-ACM INSULATION

- — AXX ASBESTOS TEST LOCATION
- — [AXX] LAB TEST RESULTS POSITIVE FOR ASBESTOS
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. SAMPLES HAVE EHS0708- PREFIX UNLESS OTHERWISE NOTED.
- [Hatched Box] HATCHING INDICATES AREAS NOT INVESTIGATED THIS SURVEY

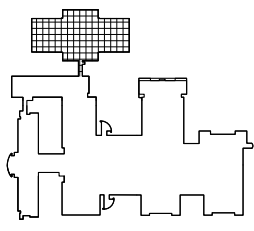
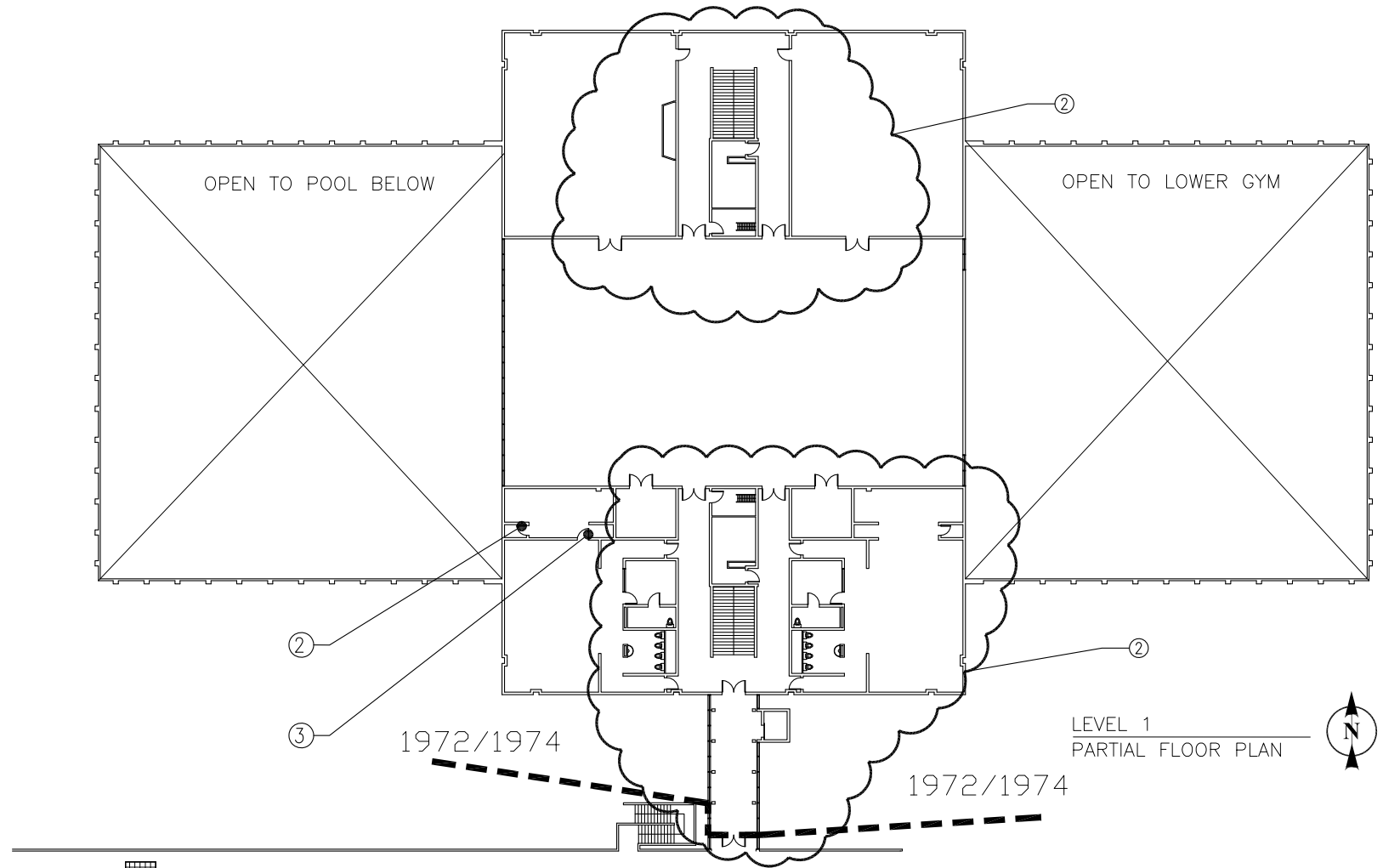
EHS ALASKA
 INCORPORATED
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 11901 Business Blvd, Suite 206, Eagle River, AK 99577-7701
 PH: 907-694-1383 FAX: 907-694-1382

ANCHORAGE SCHOOL DISTRICT
 EAST HIGH SCHOOL
 SECURITY HARDWARE UPGDS
 SAMPLE & DOOR LOCATIONS

DESIGNED: BJZ
 DRAWN: BJZ
 CHECKED: RAF

PROJECT NO.:
 DWG. TITLE:

JOB No. 8084-01
 DATE: 28-30, 2008
 SCALE: N.T.S.
 of 6 B4



KEY PLAN

DOOR DESCRIPTION & LEGEND

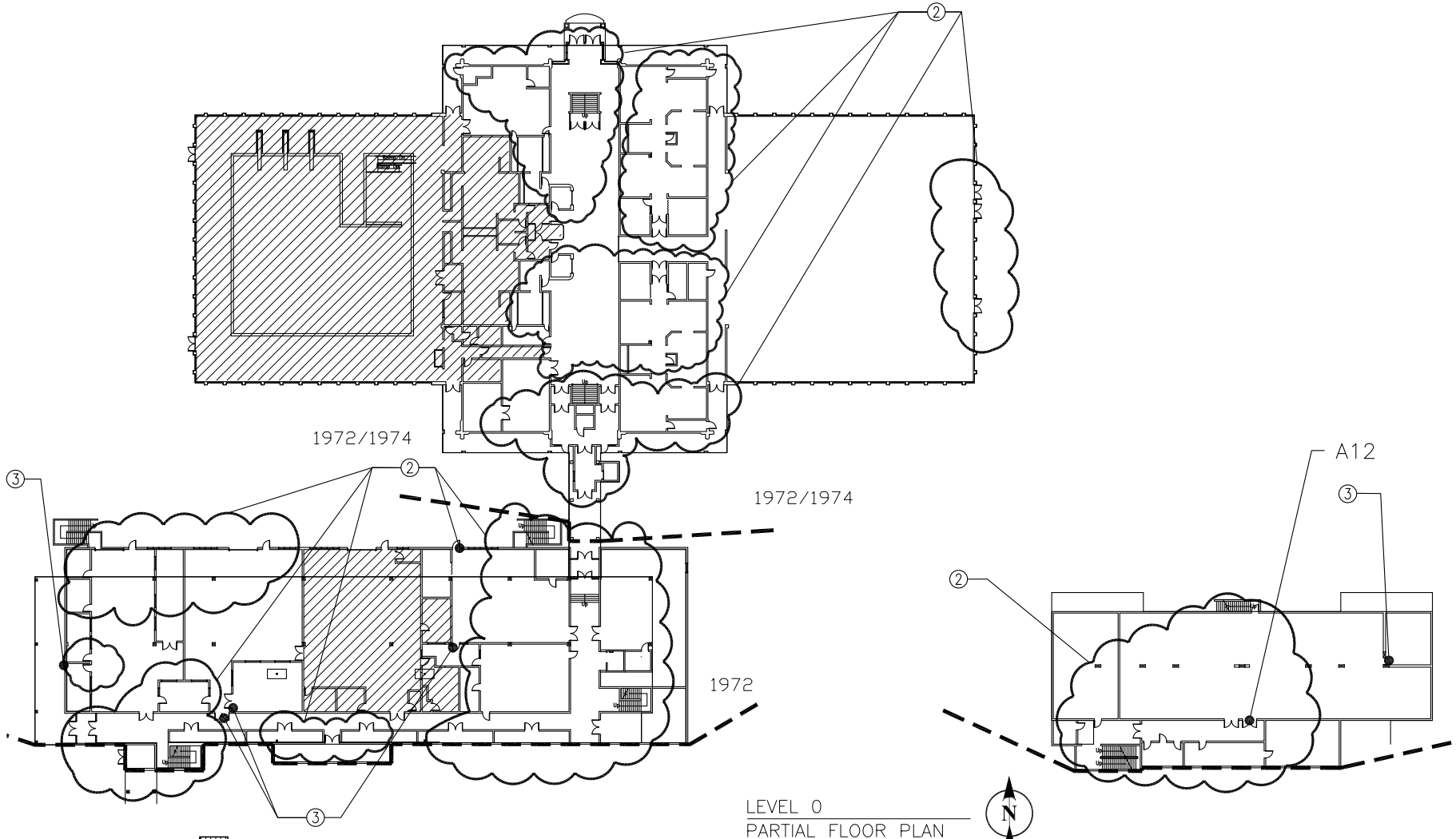
- ① WOOD DOOR WITH ACM INSULATION
- ② METAL DOOR WITH OR WITHOUT MANUFACTURER LABEL WITH NON-ACM INSULATION
- ③ WOOD DOOR WITH NON-ACM INSULATION

- AXX ASBESTOS TEST LOCATION
- AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. SAMPLES HAVE EHS0708- PREFIX UNLESS OTHERWISE NOTED.
- ▨ HATCHING INDICATES AREAS NOT INVESTIGATED THIS SURVEY

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ANCHORAGE SCHOOL DISTRICT
 EAST HIGH SCHOOL
 SECURITY HARDWARE UPGDS
 SAMPLE & DOOR LOCATIONS

DESIGNED: BJZ	PROJECT NO. 6864-01
DRAWN: BJZ	JDF: 28-30, 2008
CHECKED: RAF	B5
SCALE: N.T.S.	of 6



DOOR DESCRIPTION & LEGEND

- ① WOOD DOOR WITH ACM INSULATION
- ② METAL DOOR WITH OR WITHOUT MANUFACTURER LABEL WITH NON-ACM INSULATION
- ③ WOOD DOOR WITH NON-ACM INSULATION

- — AXX ASBESTOS TEST LOCATION
 - — [AXX] LAB TEST RESULTS POSITIVE FOR ASBESTOS
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. SAMPLES HAVE EHS0708- PREFIX UNLESS OTHERWISE NOTED.
- HATCHING INDICATES AREAS NOT INVESTIGATED THIS SURVEY

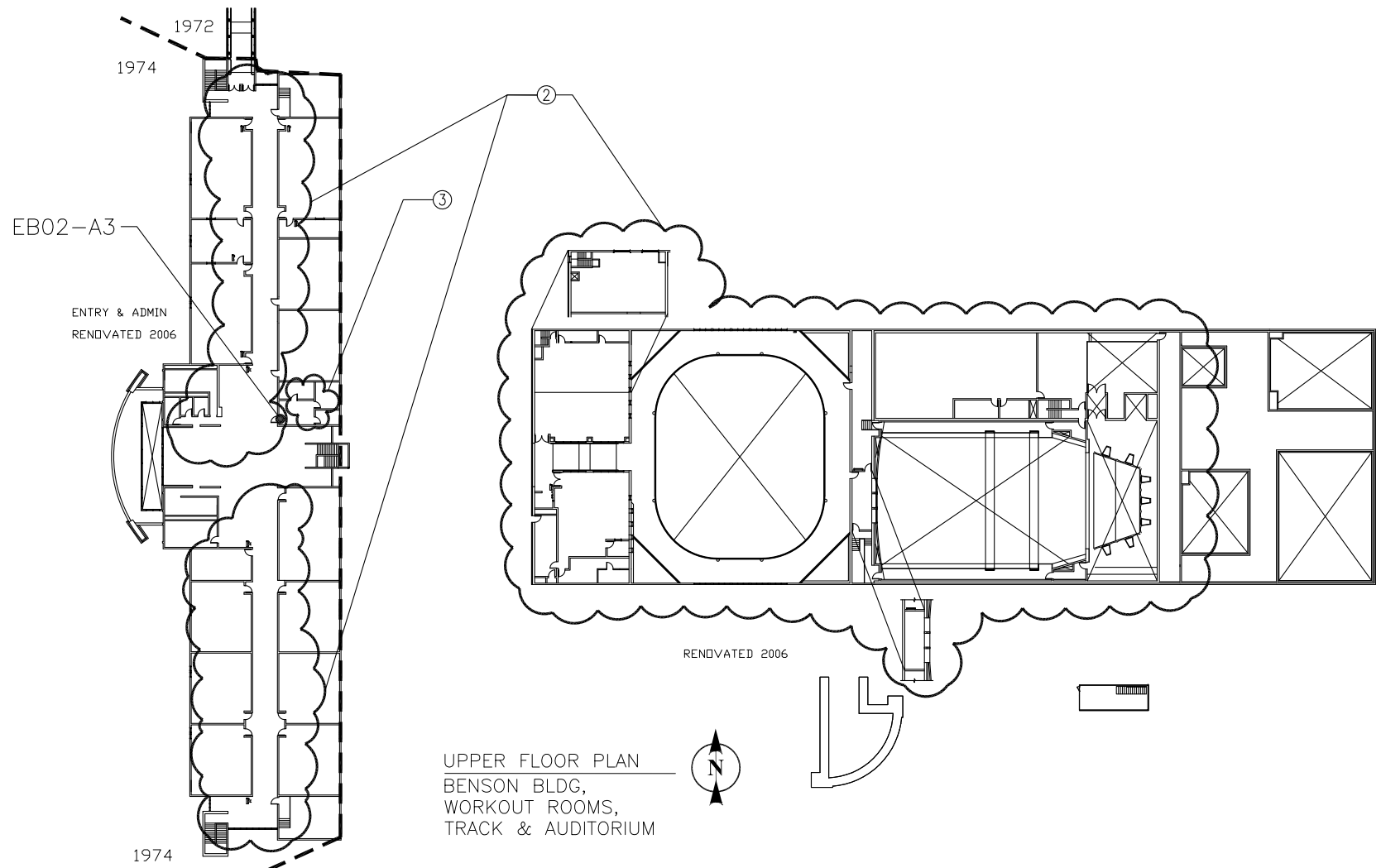
EHS ALASKA
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 PH: 907-684-1383 FAX: 907-684-1382

ANCHORAGE SCHOOL DISTRICT
 EAST HIGH SCHOOL
 SECURITY HARDWARE UPGDS
 SAMPLE & DOOR LOCATIONS

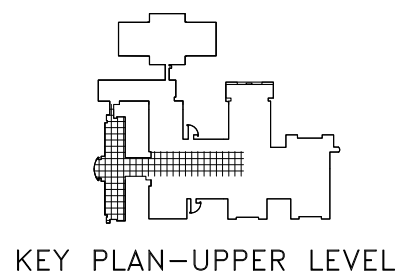
DESIGNED: BJZ
 DRAWN: BJZ
 CHECKED: RAF

PROJECT NO.
 DWG. TITLE:

JOB No. 6864-01
 DATE: 28-30, 2008
 SCALE: N.T.S.
 of 6 B6



UPPER FLOOR PLAN
 BENSON BLDG,
 WORKOUT ROOMS,
 TRACK & AUDITORIUM



KEY PLAN-UPPER LEVEL

DOOR DESCRIPTION & LEGEND

- ① WOOD DOOR WITH ACM INSULATION
- ② METAL DOOR WITH OR WITHOUT MANUFACTURER LABEL WITH NON-ACM INSULATION
- ③ WOOD DOOR WITH NON-ACM INSULATION

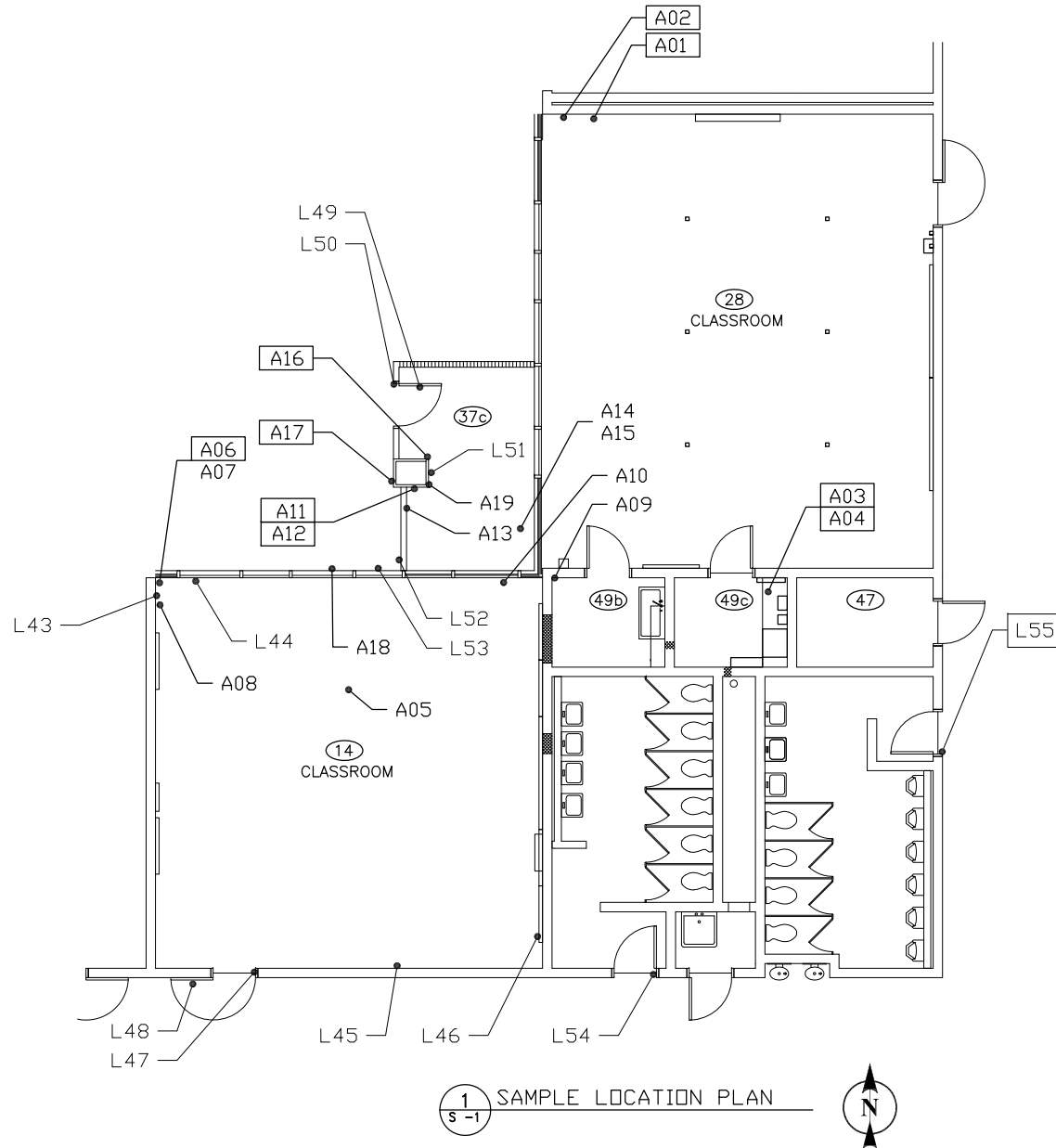
- AXX ASBESTOS TEST LOCATION
- AXX LAB TEST RESULTS POSITIVE FOR ASBESTOS
- REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. SAMPLES HAVE EHS0708- PREFIX UNLESS OTHERWISE NOTED.
- ▨ HATCHING INDICATES AREAS NOT INVESTIGATED THIS SURVEY



ANCHORAGE SCHOOL DISTRICT
 EAST HIGH SPED CLASSROOM REMODEL
 ANCHORAGE, ALASKA
 SAMPLE LOCATION DRAWING

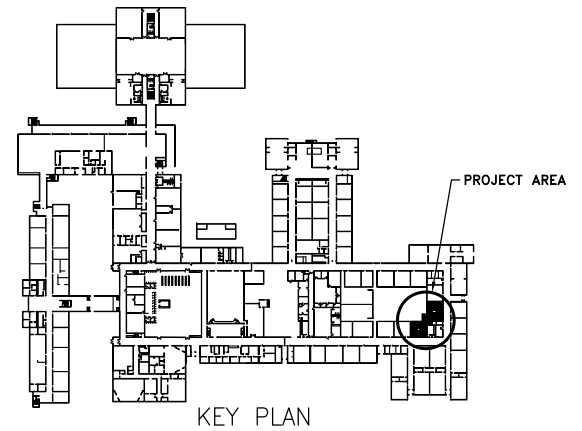
PROJECT NO.	6539
DESIGNED:	RLB
DRAWN:	JGL
CHECKED:	RAF
SCALE:	NO SCALE
DWG. TITLE:	6539-SL.DWG
JOB No.	JGL
DATE:	7-03/07

S-1
 of 1



LEGEND

- AXX ASBESTOS SAMPLING LOCATION
 - AXX ASBESTOS SAMPLING LOCATION WITH GREATER THAN 1% ASBESTOS.
 - LXX XRF LEAD TEST LOCATION
 - LXX XRF LEAD TEST CLASSIFIED AS LEAD-BASED PAINT
- ALL SAMPLES HAVE THE PREFIX SPED-0707- UNLESS OTHERWISE NOTED.





EAST ANCHORAGE HIGH
4025 E. NORTHERN LIGHTS
ANCHORAGE, ALASKA

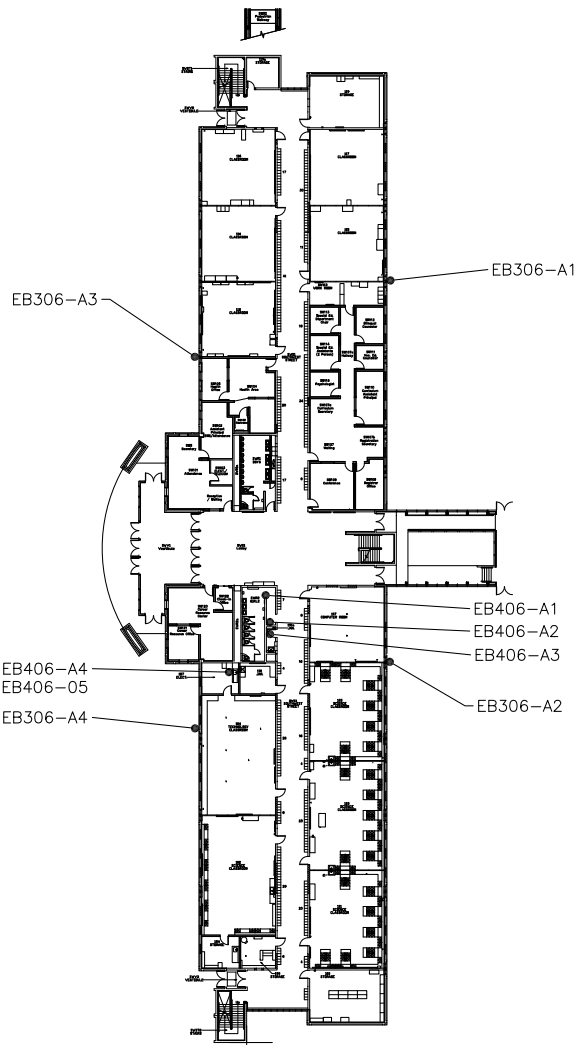
BULK SAMPLE LOCATIONS
MARCH 2005 APRIL 2006
3/6/06, 4/10/06
CADD FILE: 6209-S1.DWG

SHEET NO.
1 OF 4

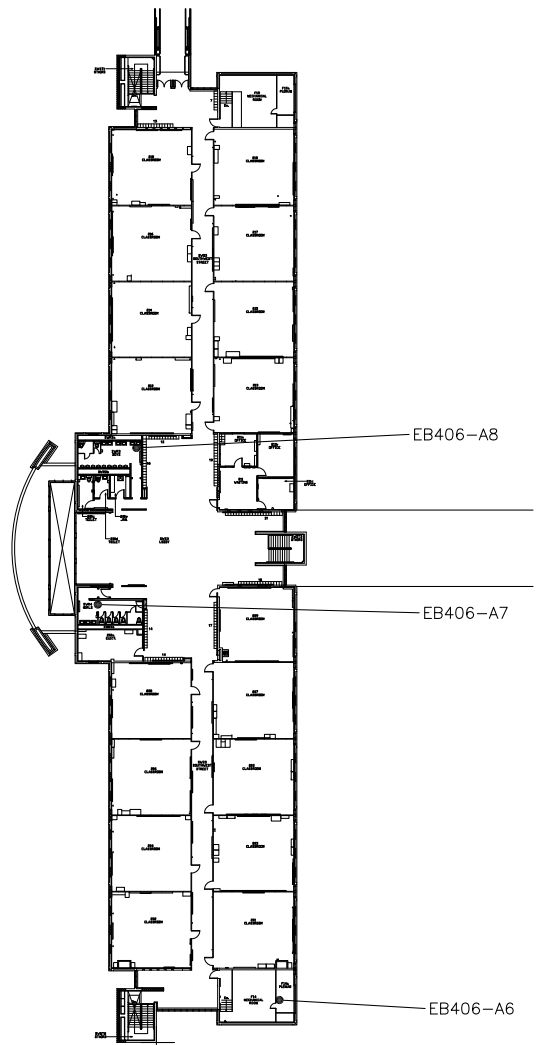
BULK ASBESTOS SAMPLES TAKEN IN MARCH 2006 BY EHS-ALASKA, INC.
HAVE A EB306- PREFIX.
BULK ASBESTOS SAMPLES TAKEN IN APRIL 2006 BY EHS-ALASKA, INC.
HAVE A EB406- PREFIX.

LEGEND

- AXX ASBESTOS SAMPLE LOCATION
- AXX SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS



1 LOWER LEVEL FLOOR PLAN
SCALE: NOT TO SCALE



2 UPPER LEVEL FLOOR PLAN
SCALE: NOT TO SCALE



EAST ANCHORAGE HIGH
4025 E. NORTHERN LIGHTS
ANCHORAGE, ALASKA

BULK SAMPLE LOCATIONS
NOVEMBER 2005

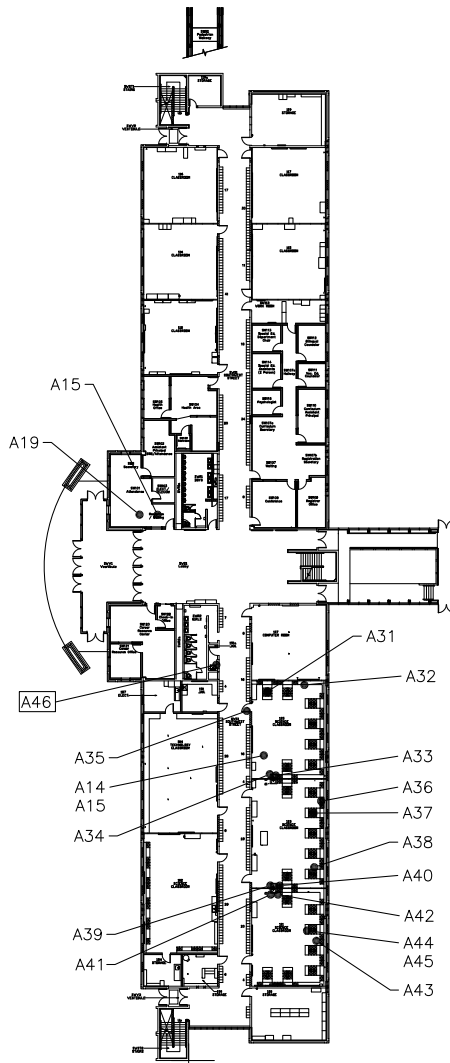
11/19/05
CADD FILE: 6209-S1.DWG

SHEET NO.
2 OF 4

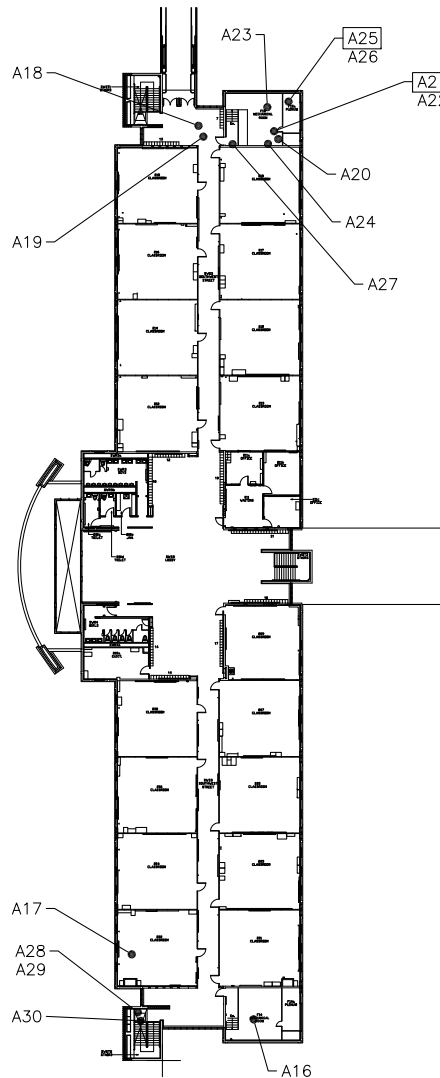
BULK ASBESTOS SAMPLES TAKEN IN NOVEMBER 2005 BY EHS-ALASKA, INC.
HAVE A EB1105- PREFIX.

LEGEND

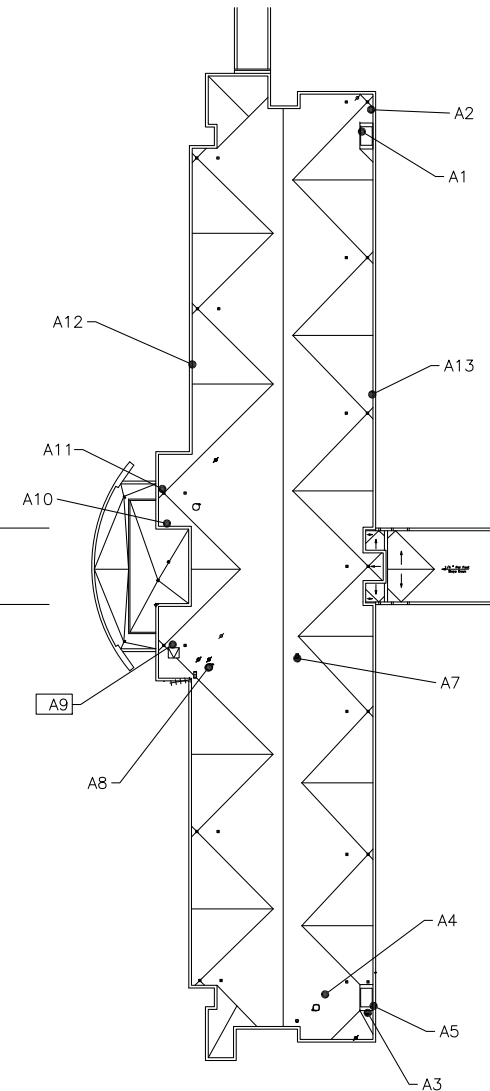
- AXX ASBESTOS SAMPLE LOCATION
- AXX SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS



1 LOWER LEVEL FLOOR PLAN
SCALE: NOT TO SCALE



2 UPPER LEVEL FLOOR PLAN
SCALE: NOT TO SCALE



3 ROOF PLAN
SCALE: NOT TO SCALE



EAST ANCHORAGE HIGH
4025 E. NORTHERN LIGHTS
ANCHORAGE, ALASKA

BULK SAMPLE LOCATIONS
MARCH AND APRIL 2006
3/6/06 - 4/10/06
CADD FILE: 6209-S1.DWG

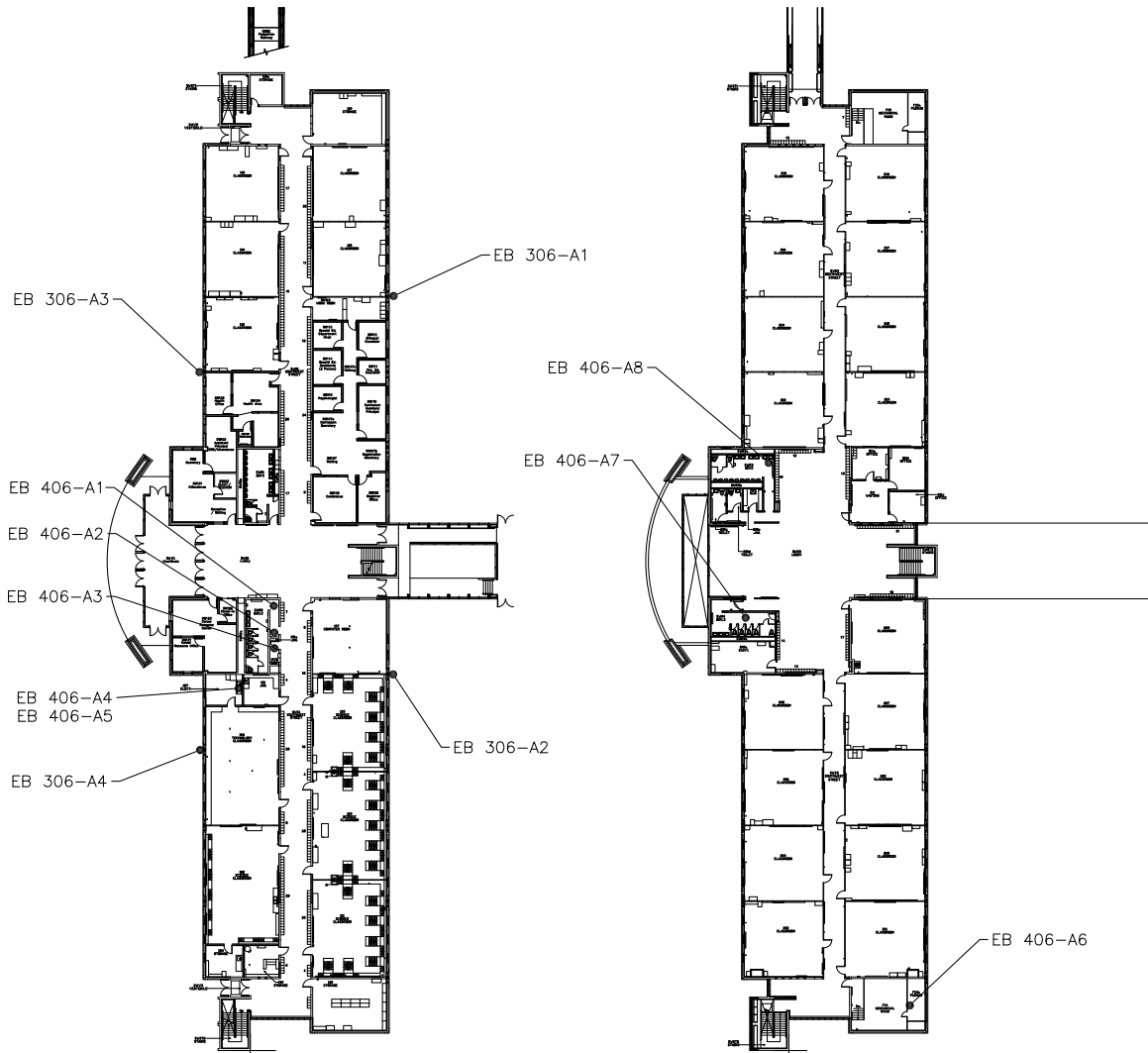
SHEET NO.
3 OF 4

BULK ASBESTOS SAMPLES TAKEN IN MARCH 2006 BY EHS-ALASKA, INC.
HAVE A EB306- PREFIX.

BULK ASBESTOS SAMPLES TAKEN IN APRIL 2006 BY EHS-ALASKA, INC.
HAVE A EB406- PREFIX.

LEGEND

- AXX ASBESTOS SAMPLE LOCATION
- AXX SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS



1 LOWER LEVEL FLOOR PLAN
SCALE: NOT TO SCALE

2 UPPER LEVEL FLOOR PLAN
SCALE: NOT TO SCALE



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EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

BULK SAMPLE LOCATIONS
 NOVEMBER 2005

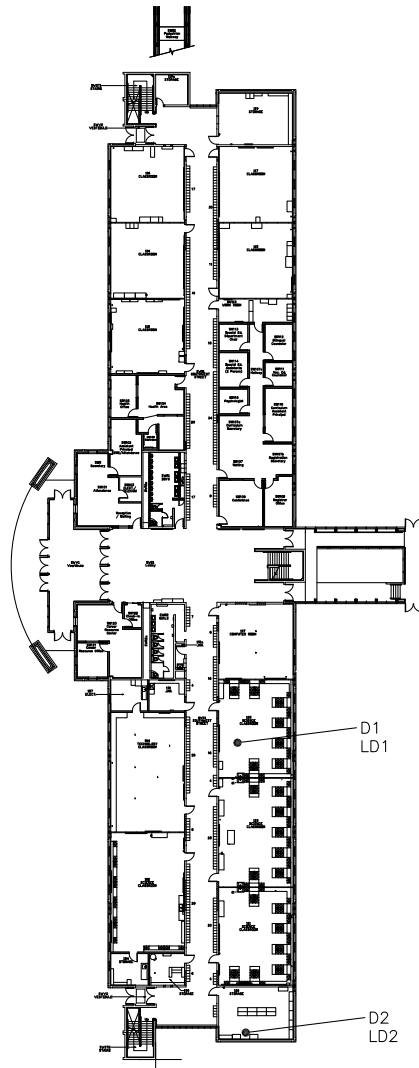
11/19/05
 CADD FILE: 6209-S1.DWG

SHEET NO.
 4 OF 4

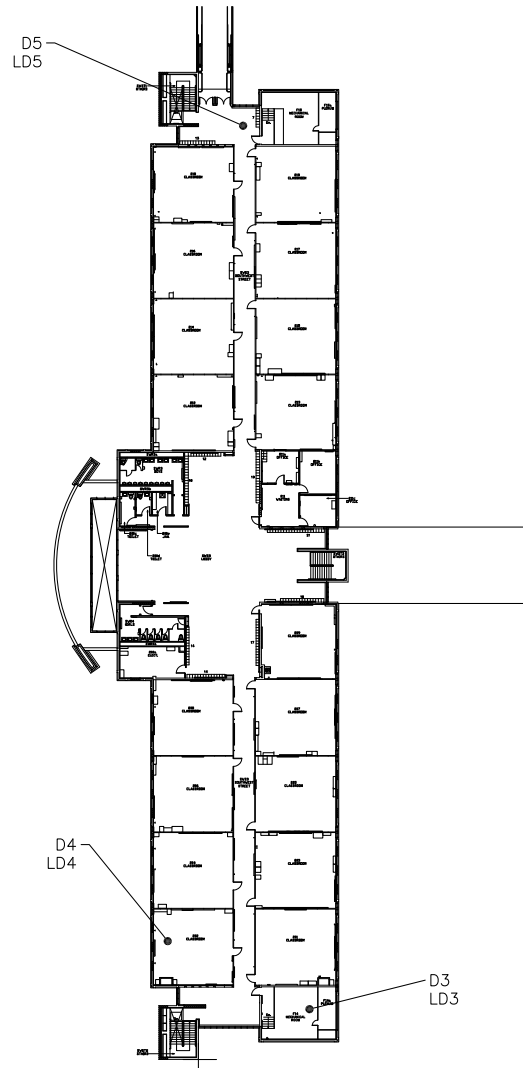
DUST SAMPLES TAKEN IN NOVEMBER 2005 BY EHS-ALASKA, INC.
 HAVE A EB1105- PREFIX.

LEGEND

- LDX LEAD DUST SAMPLE LOCATION
- DX ASBESTOS DUST SAMPLE LOCATION



1 LOWER LEVEL FLOOR PLAN
 SCALE: NOT TO SCALE



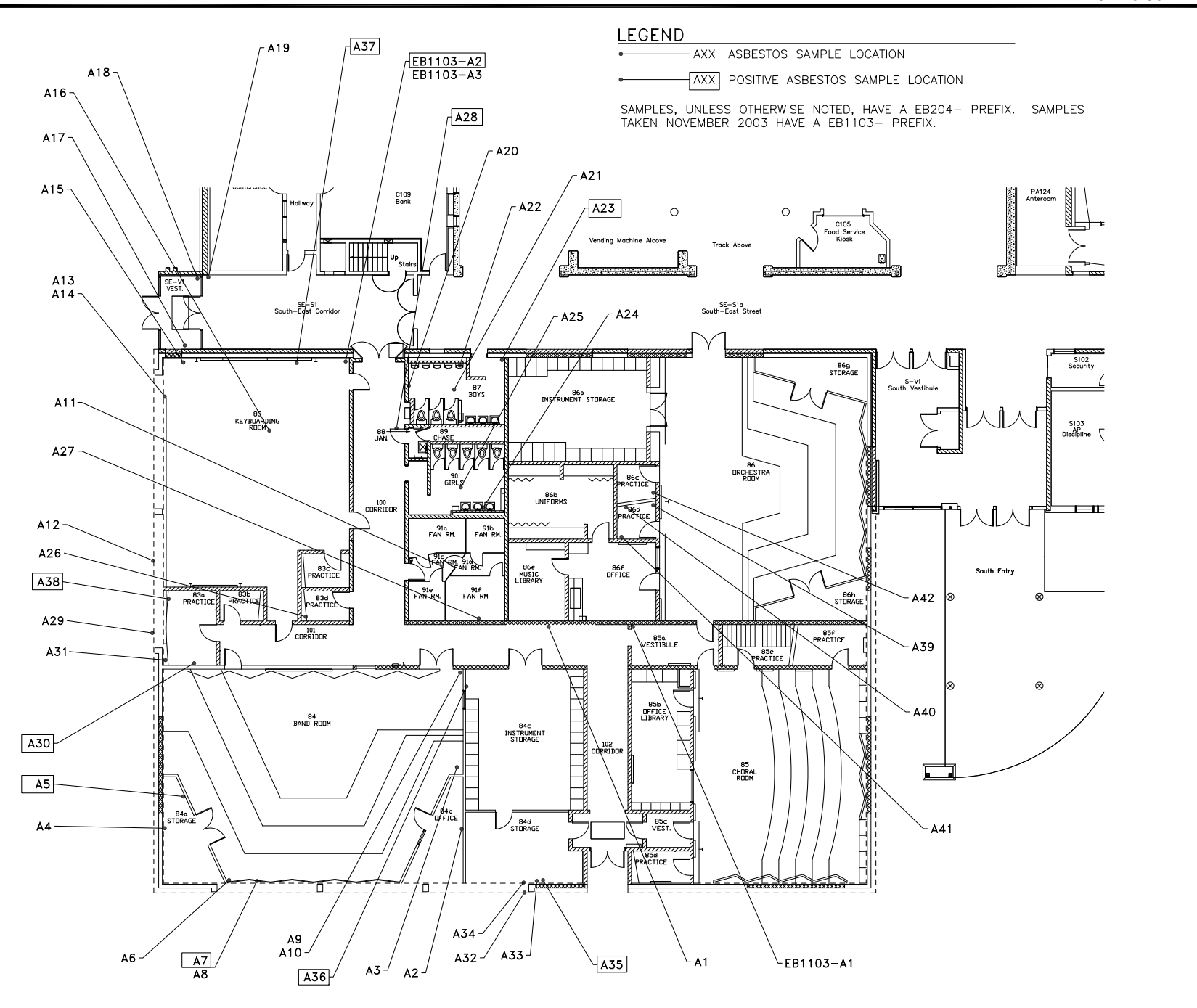
2 UPPER LEVEL FLOOR PLAN
 SCALE: NOT TO SCALE



EAST ANCHORAGE HIGH
4025 E. NORTHERN LIGHTS
ANCHORAGE, ALASKA

BULK SAMPLE LOCATIONS
NOVEMBER 2003 & FEBRUARY 2004
INSPECTED: 11/07/03 AND 02/16/04
CADD FILE: 5954-S1.DWG

SHEET NO. 1 OF 6



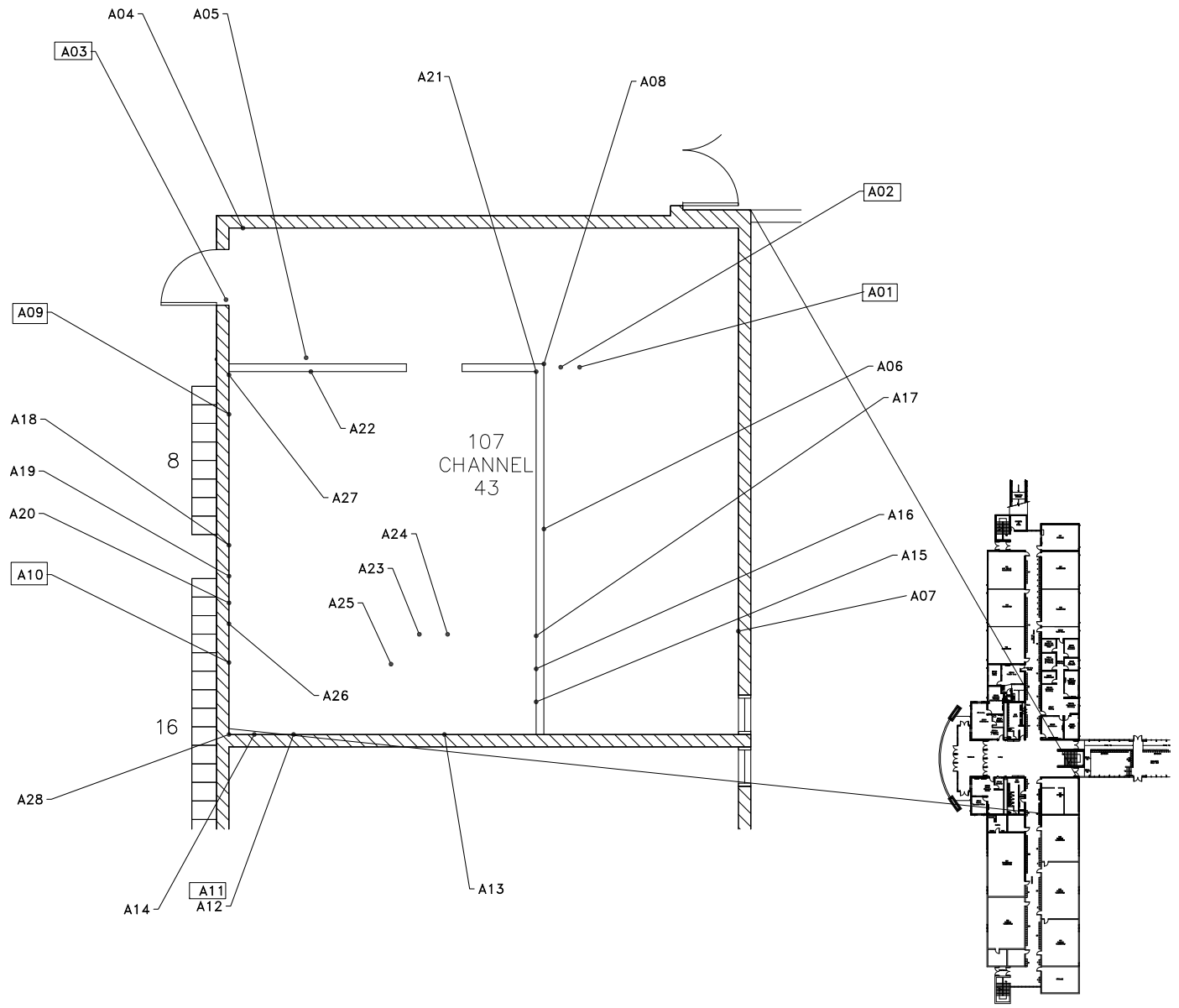


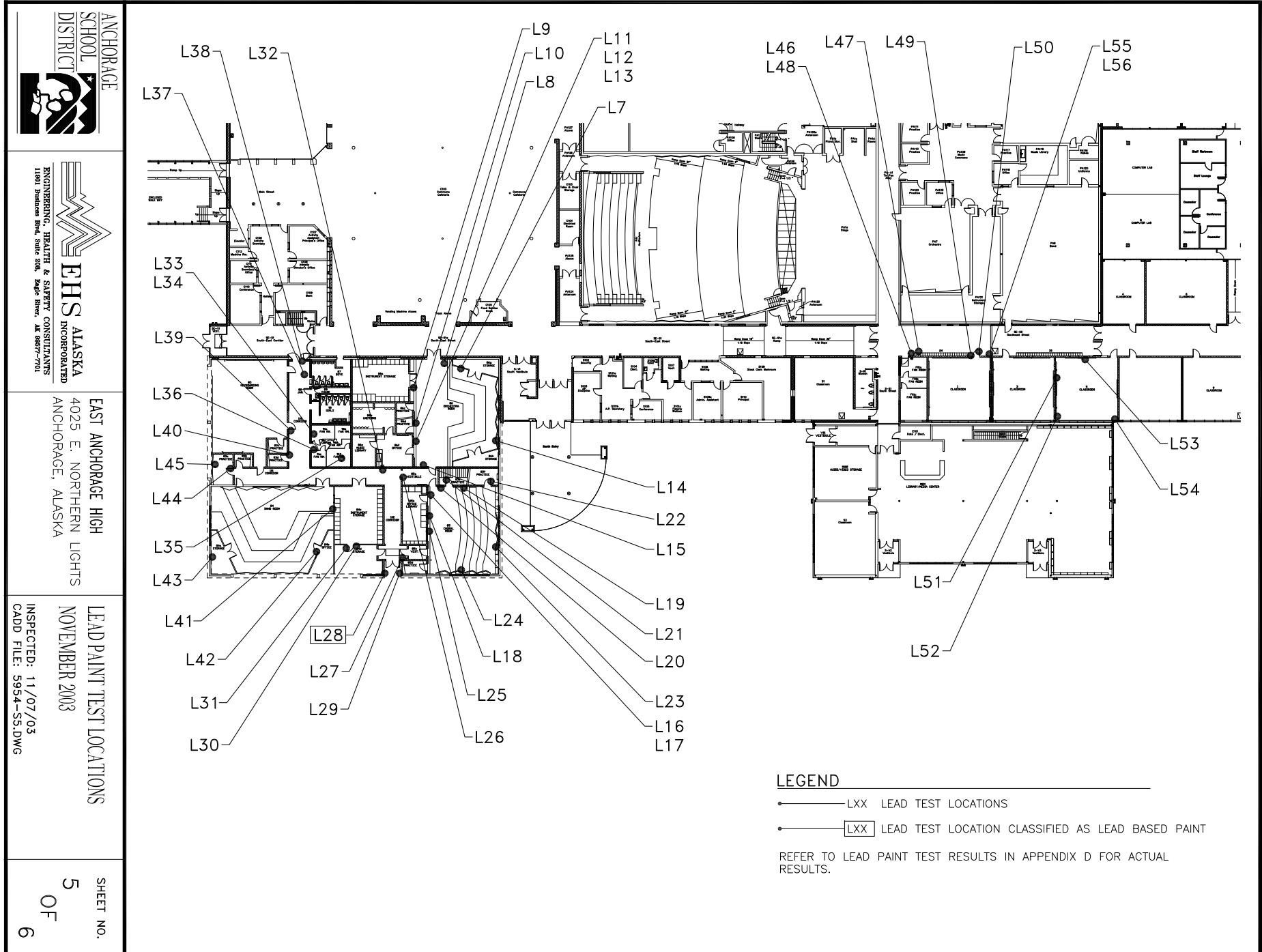
EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

BULK SAMPLE LOCATIONS
 AUGUST 2004, BENSON BLDG
 INSPECTED: 08/20/04
 CADD FILE: 5954-S4.DWG

SHEET NO.
 4 OF 6

LEGEND
 ● AXX ASBESTOS SAMPLE LOCATION
 ■ AXX POSITIVE ASBESTOS SAMPLE LOCATION
 SAMPLES, UNLESS OTHERWISE NOTED, HAVE A EB804- PREFIX.





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EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

LEAD PAINT TEST LOCATIONS
 NOVEMBER 2003
 INSPECTED: 11/07/03
 CADD FILE: 5954-SS.DWG

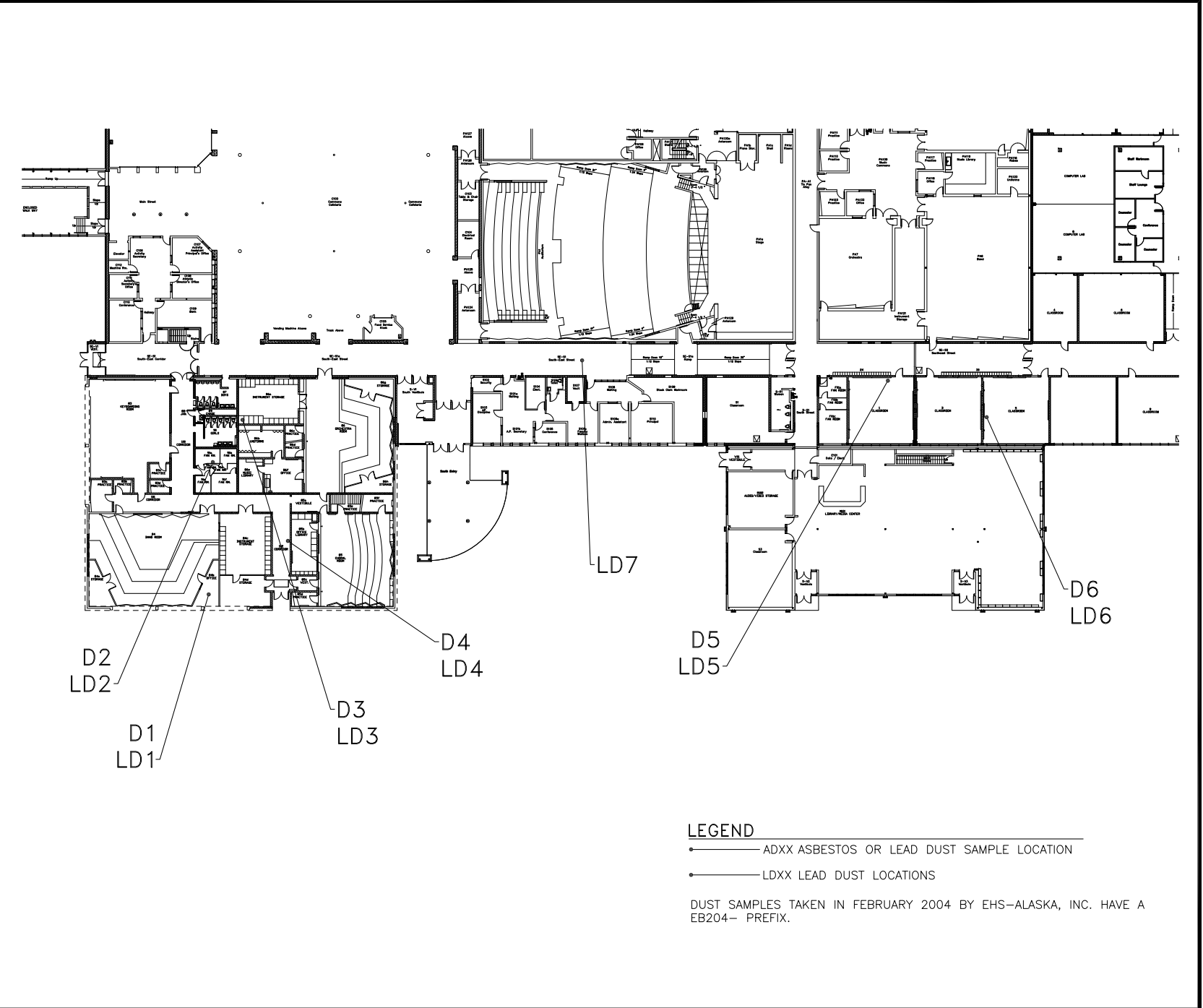
SHEET NO.
 5 OF 6



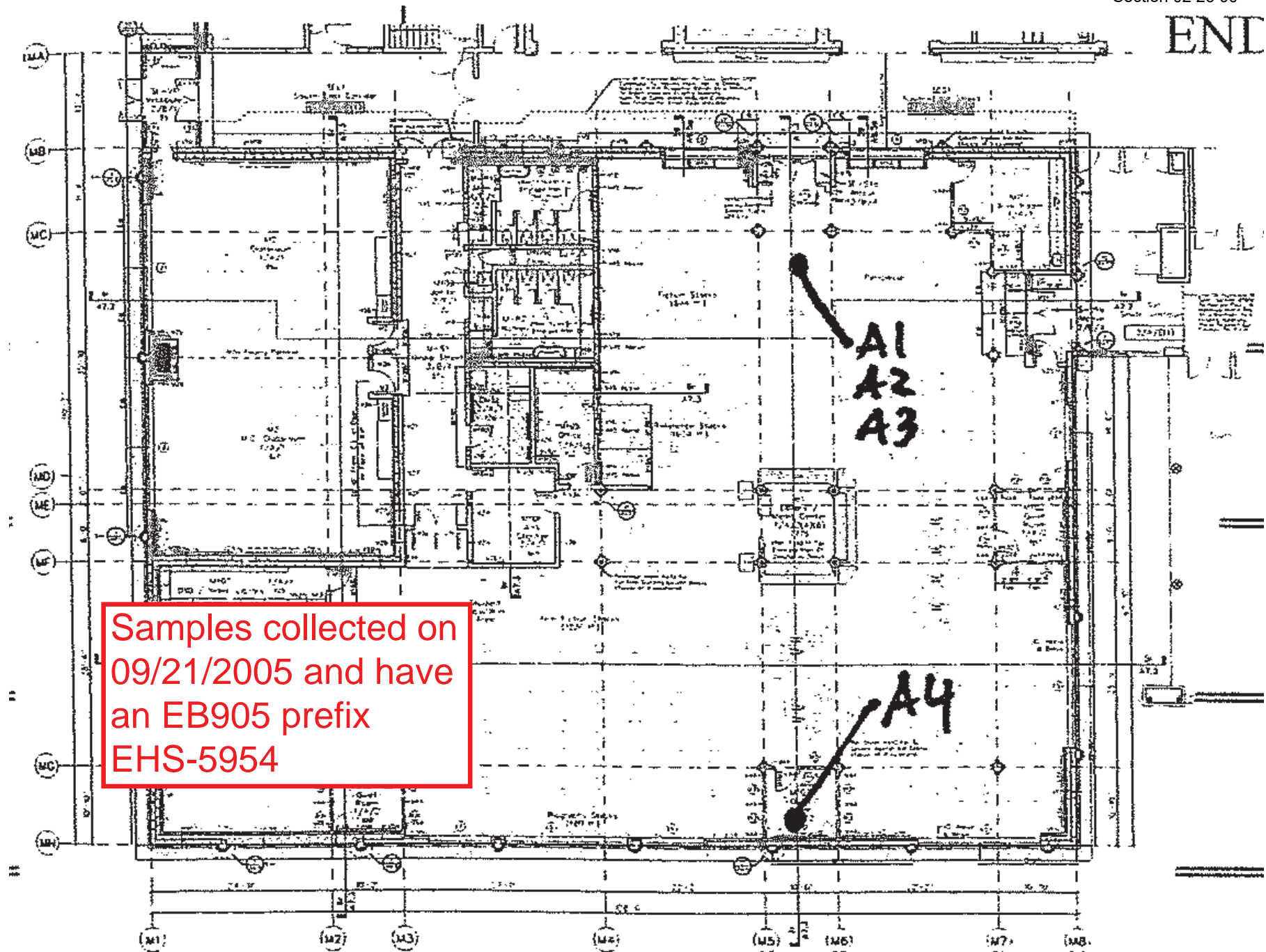
EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

DUST SAMPLE LOCATIONS
 FEBRUARY 2004
 INSPECTED: 02/16/04
 CADD FILE: 5954-S6.DWG

SHEET NO.
 6 OF 6



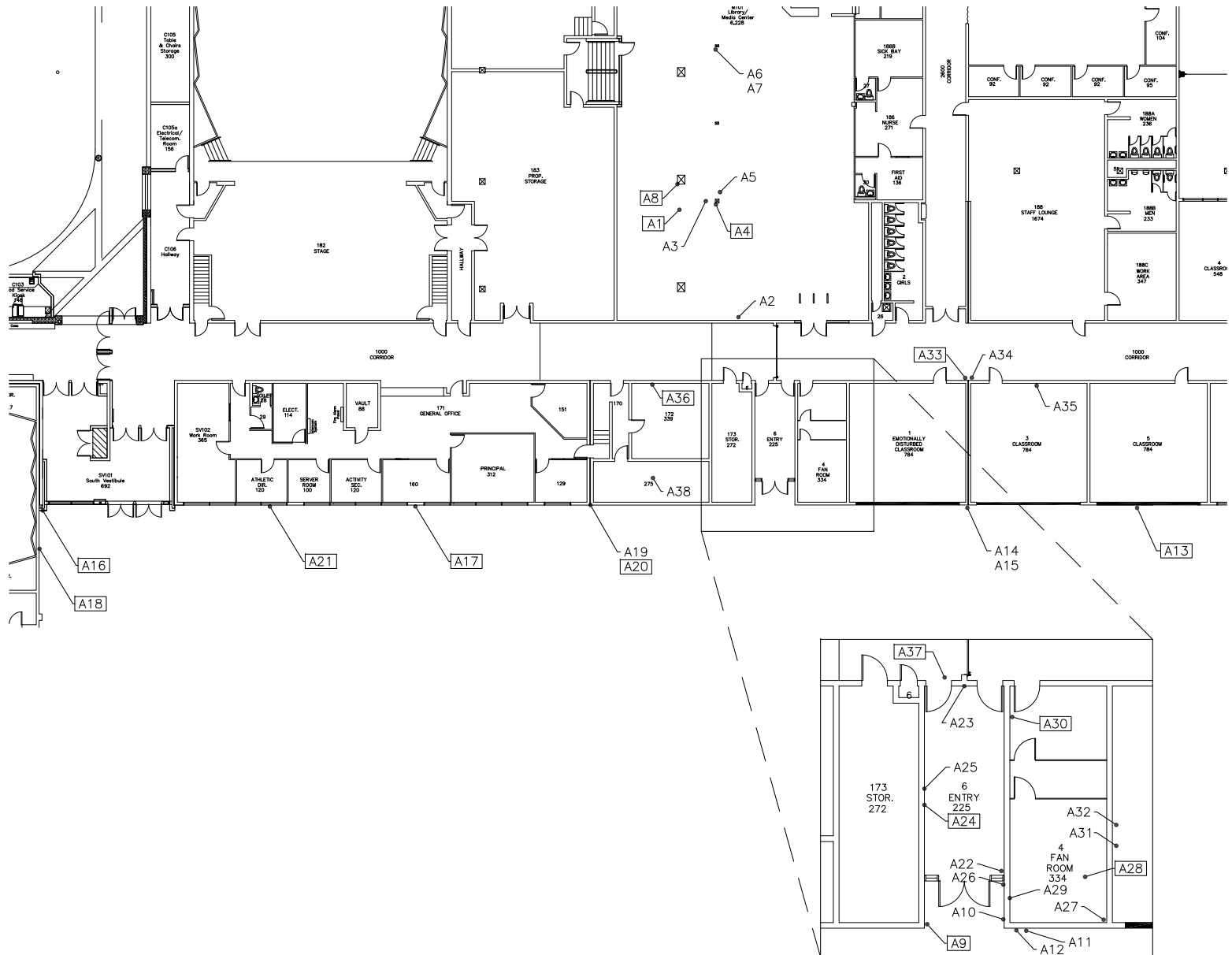
ENC



LEGEND

- AXX ASBESTOS SAMPLE LOCATION
- [Axx] SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS

BULK ASBESTOS SAMPLES TAKEN IN JANUARY 2002 BY EHS-ALASKA, INC. HAVE A EB102- PREFIX.



EHS ALASKA
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ENGINEERING, HEALTH & SAFETY CONSULTANTS
10828 Eagle River Road, Suite 202, Eagle River, AK 99577-8082

EAST ANCHORAGE HIGH
4025 E. NORTHERN LIGHTS
ANCHORAGE, ALASKA

BULK SAMPLE LOCATIONS
JANUARY 2002

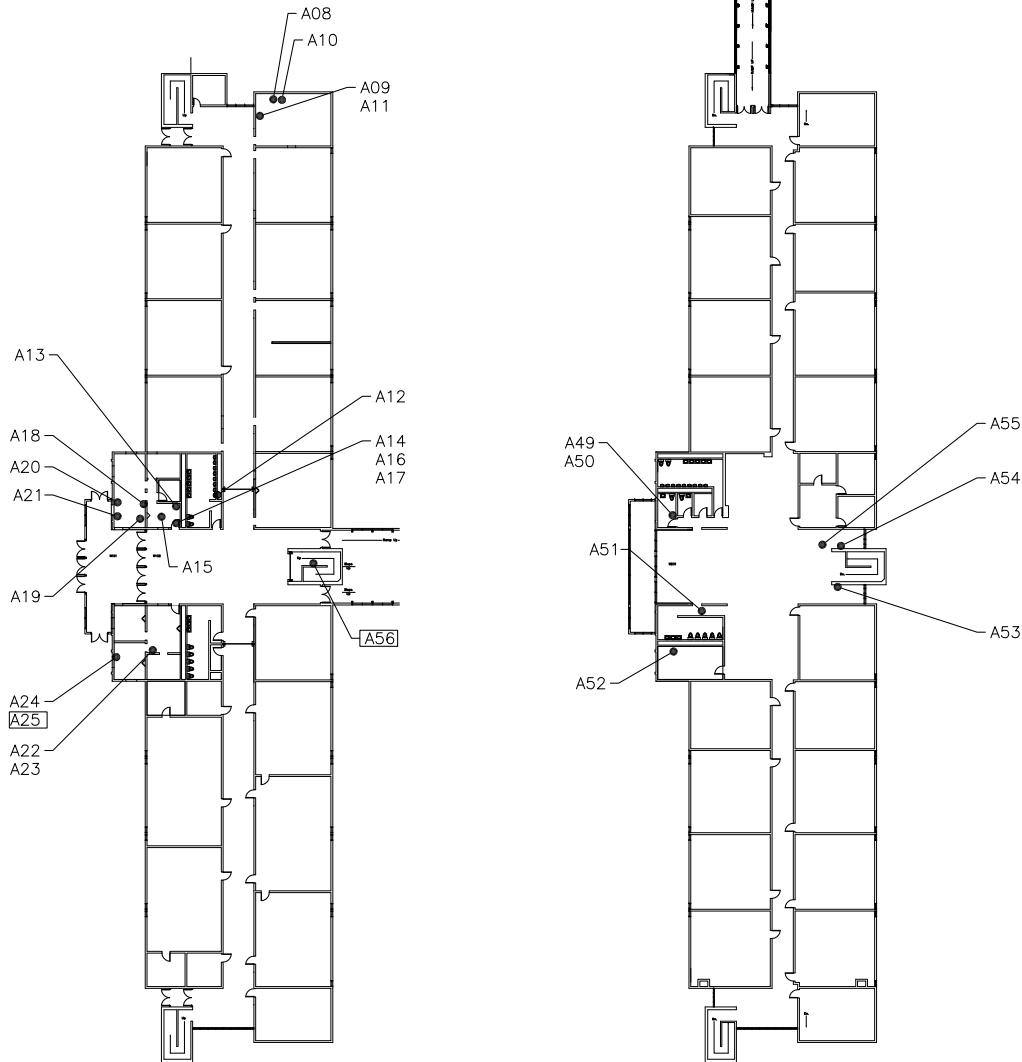
INSPECTED: 1/2/02 AND 1/4/02
CADD FILE: 5646-S1.DWG

SHEET NO.
1 OF 10

LEGEND

- — AXX ASBESTOS SAMPLE LOCATION
- — AXX SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS

BULK ASBESTOS SAMPLES TAKEN IN MARCH 2002 BY EHS-ALASKA, INC. HAVE A EB302- PREFIX.



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 ENGINEERING, HEALTH & SAFETY CONSULTANTS
 10828 Eagle River Road, Suite 202, Eagle River, AK 99577-9002

EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

BULK SAMPLE LOCATIONS
 MARCH 2002
 3/15, 3/21, 3/23, 3/27/02
 CADD FILE: 5646-S2.DWG

SHEET NO.
 2 OF
 10



EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

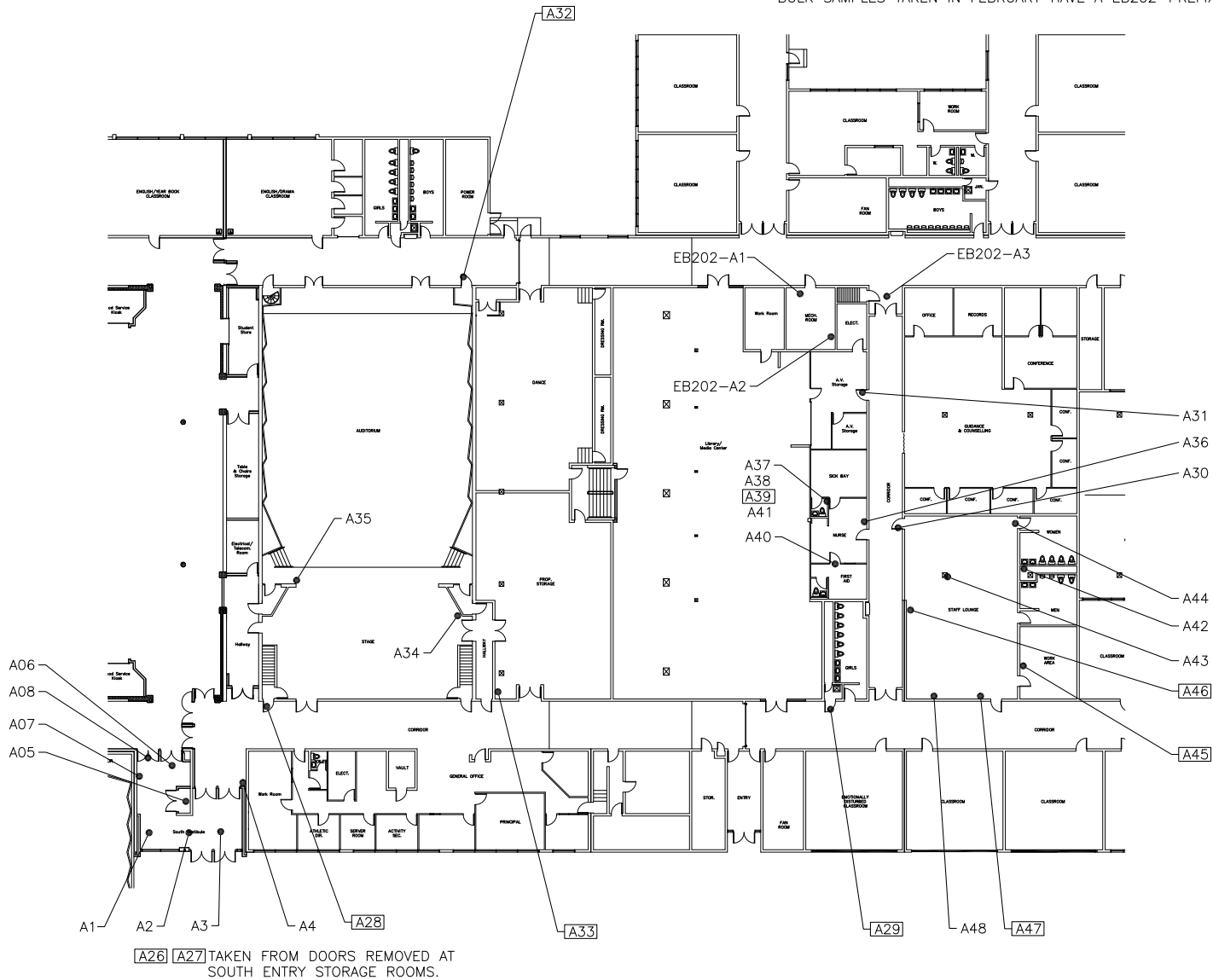
BULK SAMPLE LOCATIONS
 FEBRUARY & MARCH 2002
 2/19, 3/15, 3/21, 3/23, 3/27/02
 CADD FILE: 5646-S3

SHEET NO.
 3 OF
 10

LEGEND

- AXX ASBESTOS SAMPLE LOCATION
- [AXX]— SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS

BULK ASBESTOS SAMPLES TAKEN IN MARCH 2002
 BY EHS-ALASKA, INC. HAVE A EB302- PREFIX.
 BULK SAMPLES TAKEN IN FEBRUARY HAVE A EB202-PREFIX.

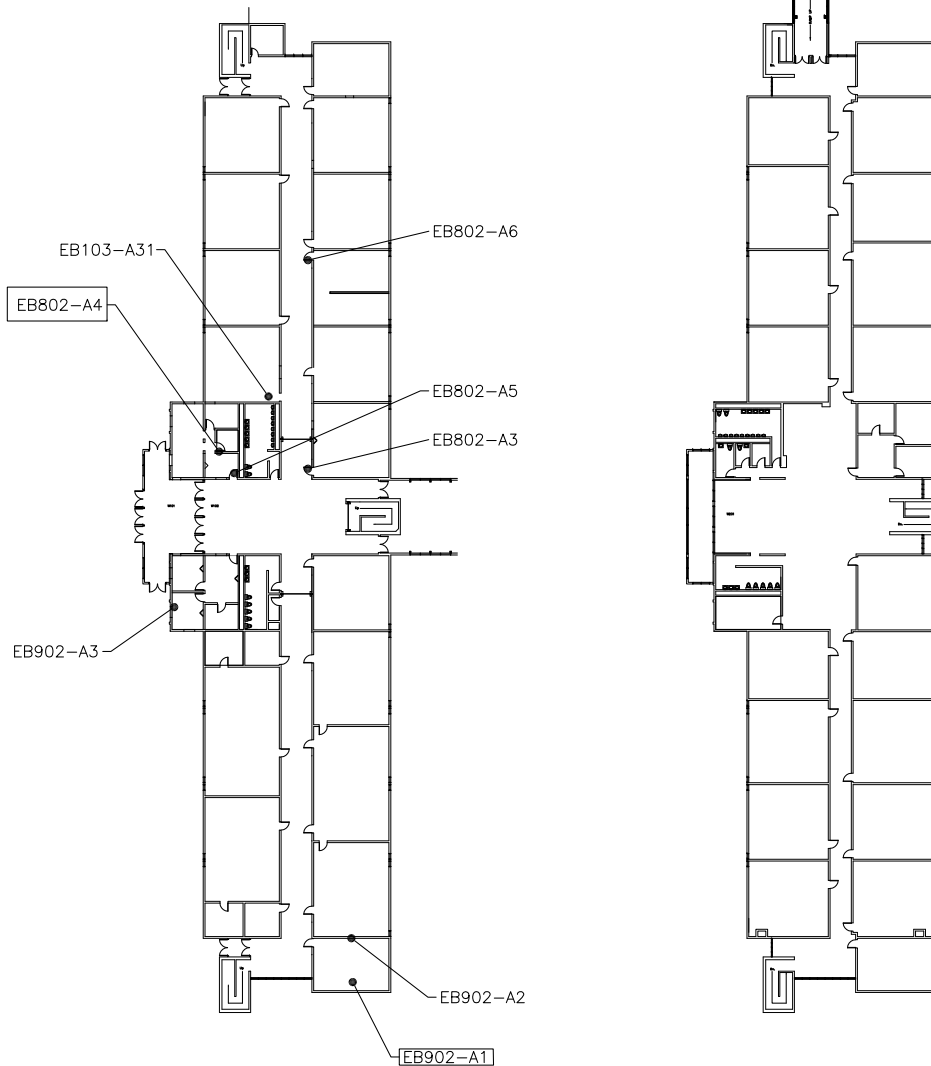


LEGEND

- — AXX ASBESTOS SAMPLE LOCATION
- — AXX SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS

BULK ASBESTOS SAMPLES TAKEN IN AUGUST 2002 BY EHS-ALASKA, INC. HAVE A EB802- PREFIX. BULK SAMPLES TAKEN IN SEPTEMBER 2002 HAVE A EB902- PREFIX.

BULK SAMPLES TAKEN IN JANUARY 2003 HAVE A EB103- PREFIX.



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 INCORPORATED
 ENGINEERING, HEALTH & SAFETY CONSULTANTS
 10828 Eagle River Road, Suite 202, Eagle River, AK 99577-9002

EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

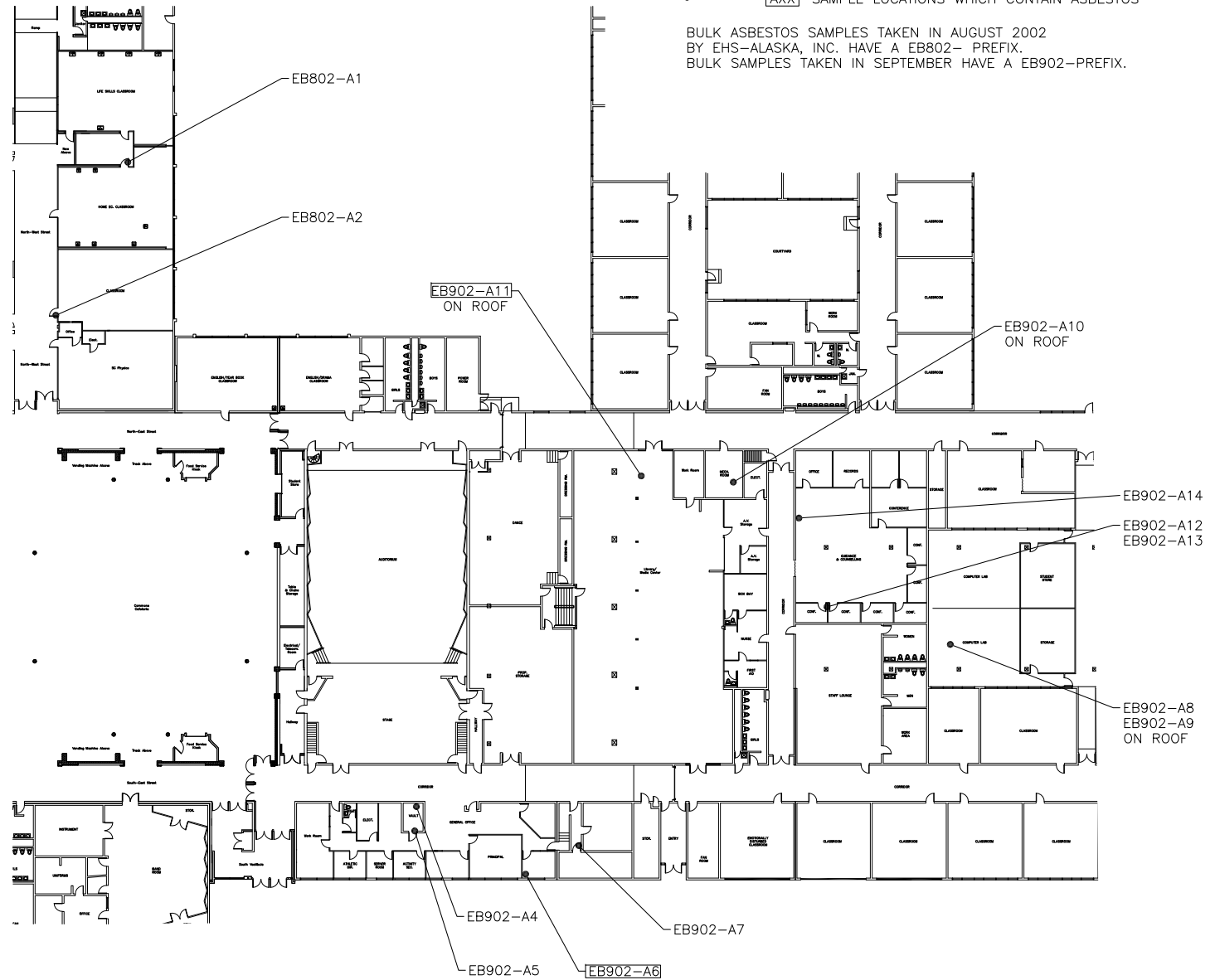
BULK SAMPLE LOCATIONS
 AUG - SEPT 2002, JANUARY 2003
 8/28, 9/27/02, 1/18/03
 CADD FILE: 5646-S4.DWG

SHEET NO.
 4 OF
 10

LEGEND

- AXX ASBESTOS SAMPLE LOCATION
- [AXX]— SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS

BULK ASBESTOS SAMPLES TAKEN IN AUGUST 2002 BY EHS-ALASKA, INC. HAVE A EB802- PREFIX. BULK SAMPLES TAKEN IN SEPTEMBER HAVE A EB902-PREFIX.



ANCHORAGE SCHOOL DISTRICT

EHS ALASKA
INCORPORATED

ENGINEERING, HEALTH & SAFETY CONSULTANTS
10828 Eagle River Road, Suite 202, Eagle River, AK 99577-8002

EAST ANCHORAGE HIGH
4025 E. NORTHERN LIGHTS
ANCHORAGE, ALASKA

BULK SAMPLE LOCATIONS
AUGUST & SEPTEMBER 2002

8/28, 9/27/02
CADD FILE: 5646-SS

SHEET NO.
5 OF
10

LEGEND

- AXX ASBESTOS SAMPLE LOCATION
 - [AXX] SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS
- BULK ASBESTOS SAMPLES TAKEN IN JANUARY 2003
 BY EHS-ALASKA, INC. HAVE A EB103- PREFIX.

ANCHORAGE
 SCHOOL
 DISTRICT

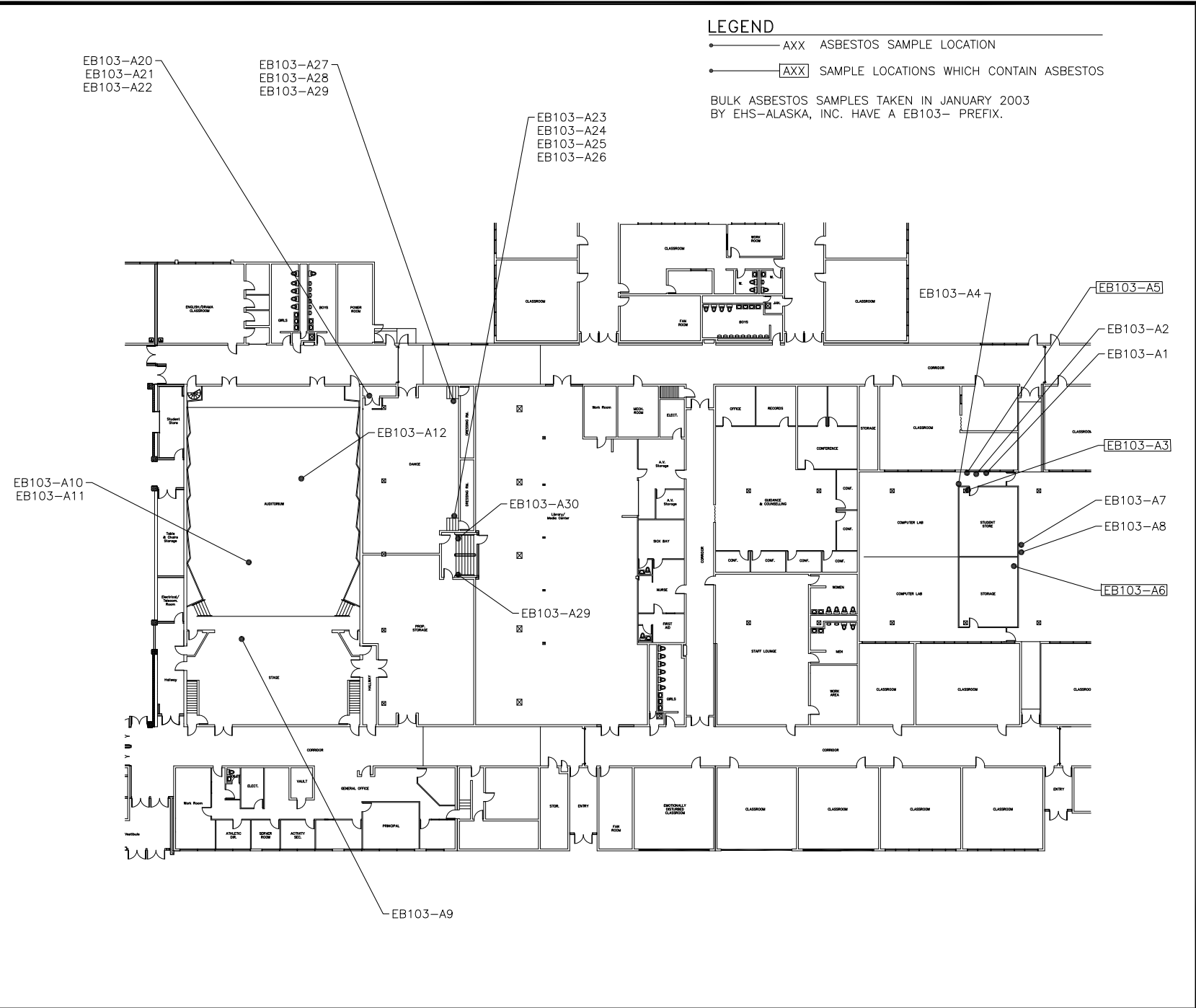
EHS ALASKA
 INCORPORATED
 ENGINEERING, HEALTH & SAFETY CONSULTANTS
 10828 Eagle River Road, Suite 202, Eagle River, AK 99577-9002

EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

BULK SAMPLE LOCATIONS
 JANUARY 2003

1/3/03, 1/18/03
 CADD FILE: 5646-S6

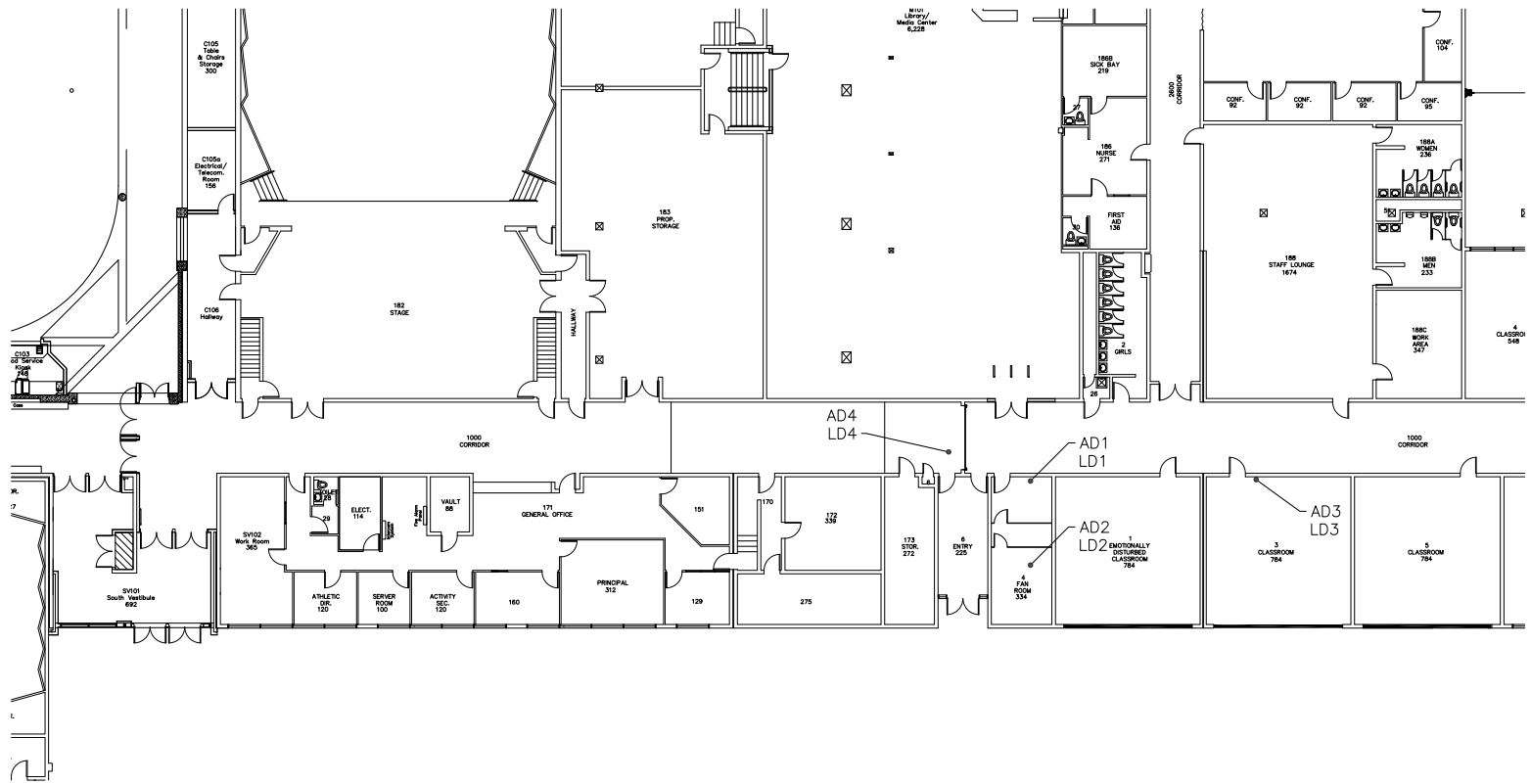
SHEET NO.
 6 OF
 10



LEGEND

- ADXX ASBESTOS OR LEAD DUST SAMPLE LOCATION
- LDXX LEAD DUST LOCATIONS

DUST SAMPLES TAKEN IN JANUARY 2002 BY EHS-ALASKA, INC. HAVE A EB102- PREFIX.



EHS ALASKA
INCORPORATED
ENGINEERING, HEALTH & SAFETY CONSULTANTS
10828 Eagle River Road, Suite 202, Eagle River, AK 99577-2002

EAST ANCHORAGE HIGH
4025 E. NORTHERN LIGHTS
ANCHORAGE, ALASKA

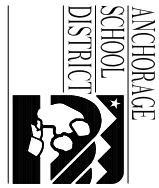
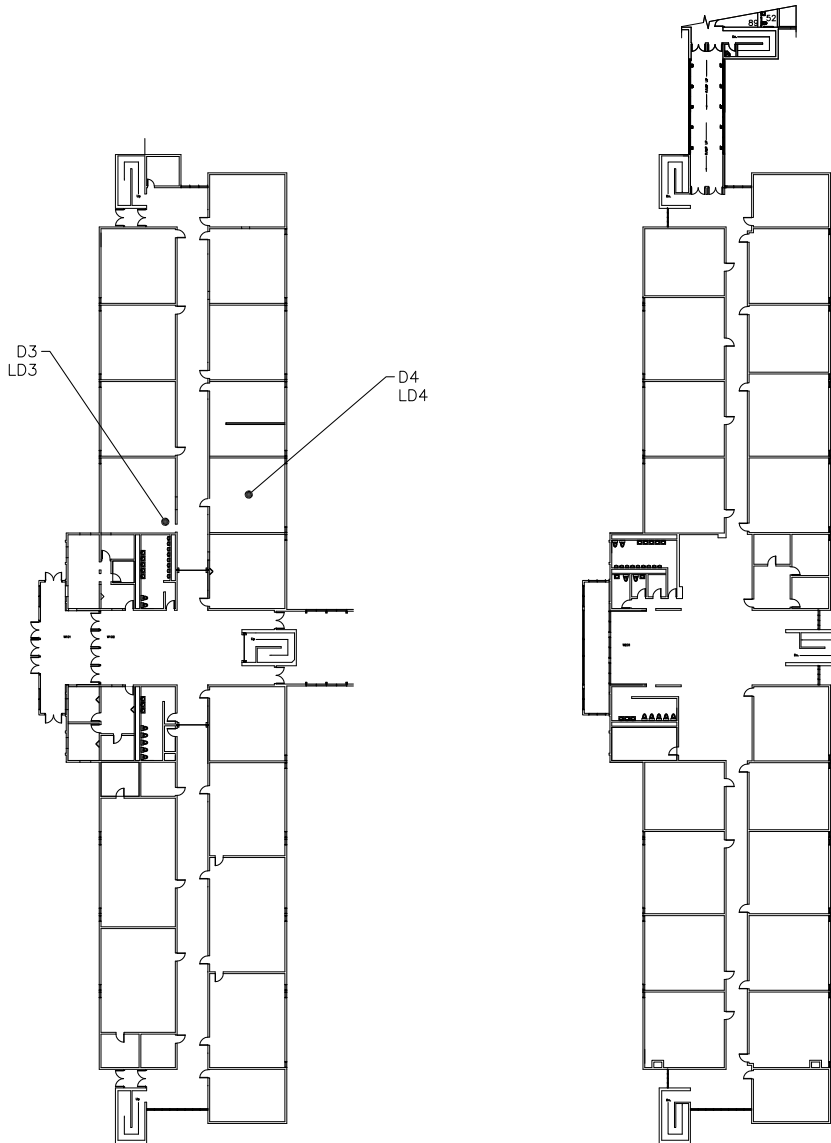
DUST SAMPLE LOCATIONS
JANUARY 2002
INSPECTED: 1/2/02 AND 1/4/02
CADD FILE: 5646-S7

SHEET NO.
7 OF
10

LEGEND

- — DXX ASBESTOS DUST SAMPLE LOCATION
- — LDX LEAD DUST SAMPLE LOCATION

DUST SAMPLES TAKEN IN JANUARY 2003 BY EHS-ALASKA, INC. HAVE A EB103- PREFIX.



EHS ALASKA
 INCORPORATED
 ENGINEERING, HEALTH & SAFETY CONSULTANTS
 10828 Eagle River Road, Suite 202, Eagle River, AK 99577-9002

EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

DUST SAMPLE LOCATIONS
 JANUARY 2003
 CADD FILE: 5646-S8.DWG

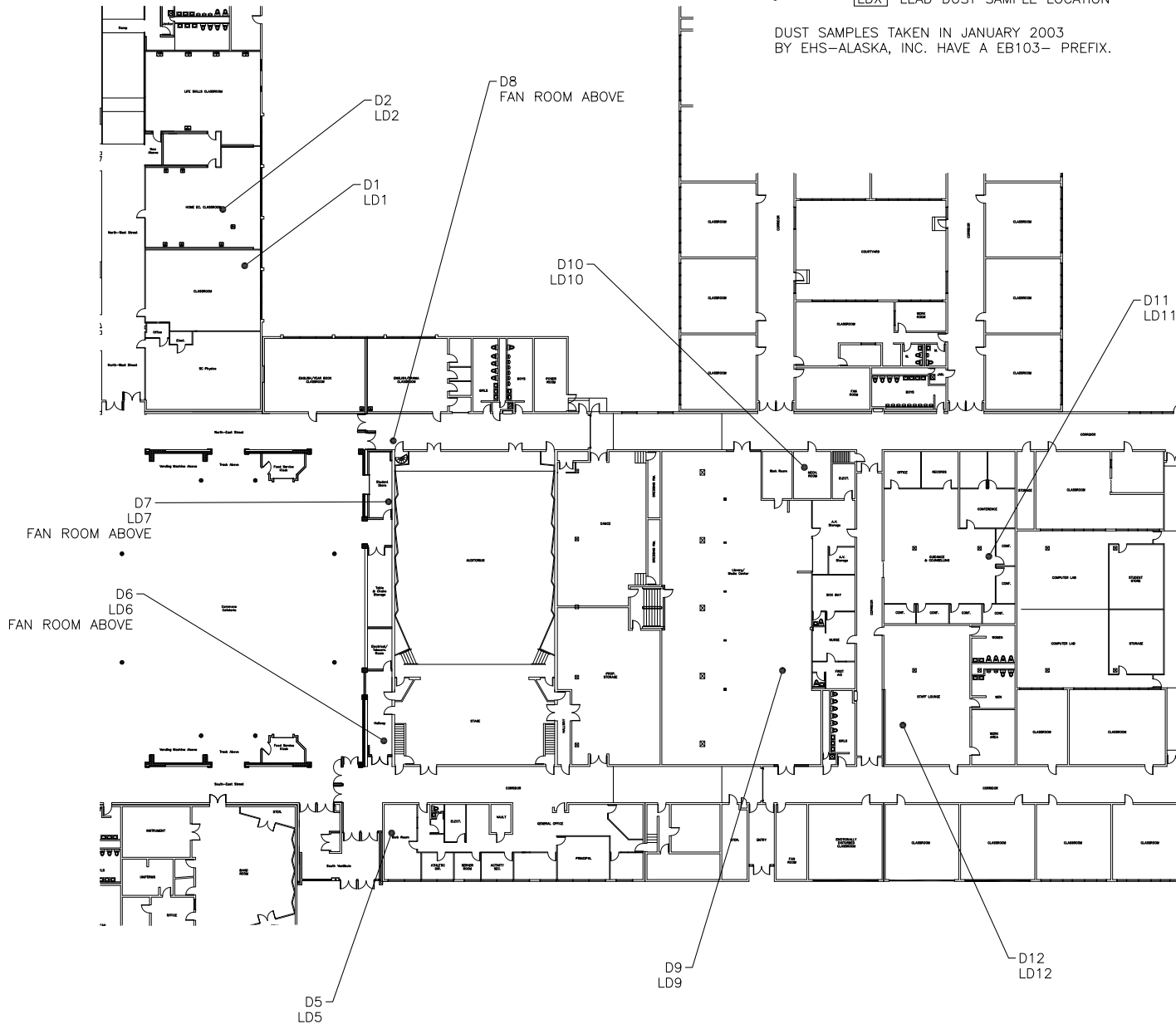
SHEET NO.
 8 OF
 10

LEGEND

—•— DXX ASBESTOS DUST SAMPLE LOCATION

—□— LDX LEAD DUST SAMPLE LOCATION

DUST SAMPLES TAKEN IN JANUARY 2003
BY EHS-ALASKA, INC. HAVE A EB103- PREFIX.




EHS ALASKA
 INCORPORATED
 ENGINEERING, HEALTH & SAFETY CONSULTANTS
 10828 Eagle River Road, Suite 202, Eagle River, AK 99577-8002

EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

DUST SAMPLE LOCATIONS

JANUARY 2003

1/18/03
 CADD FILE: 5646-S9

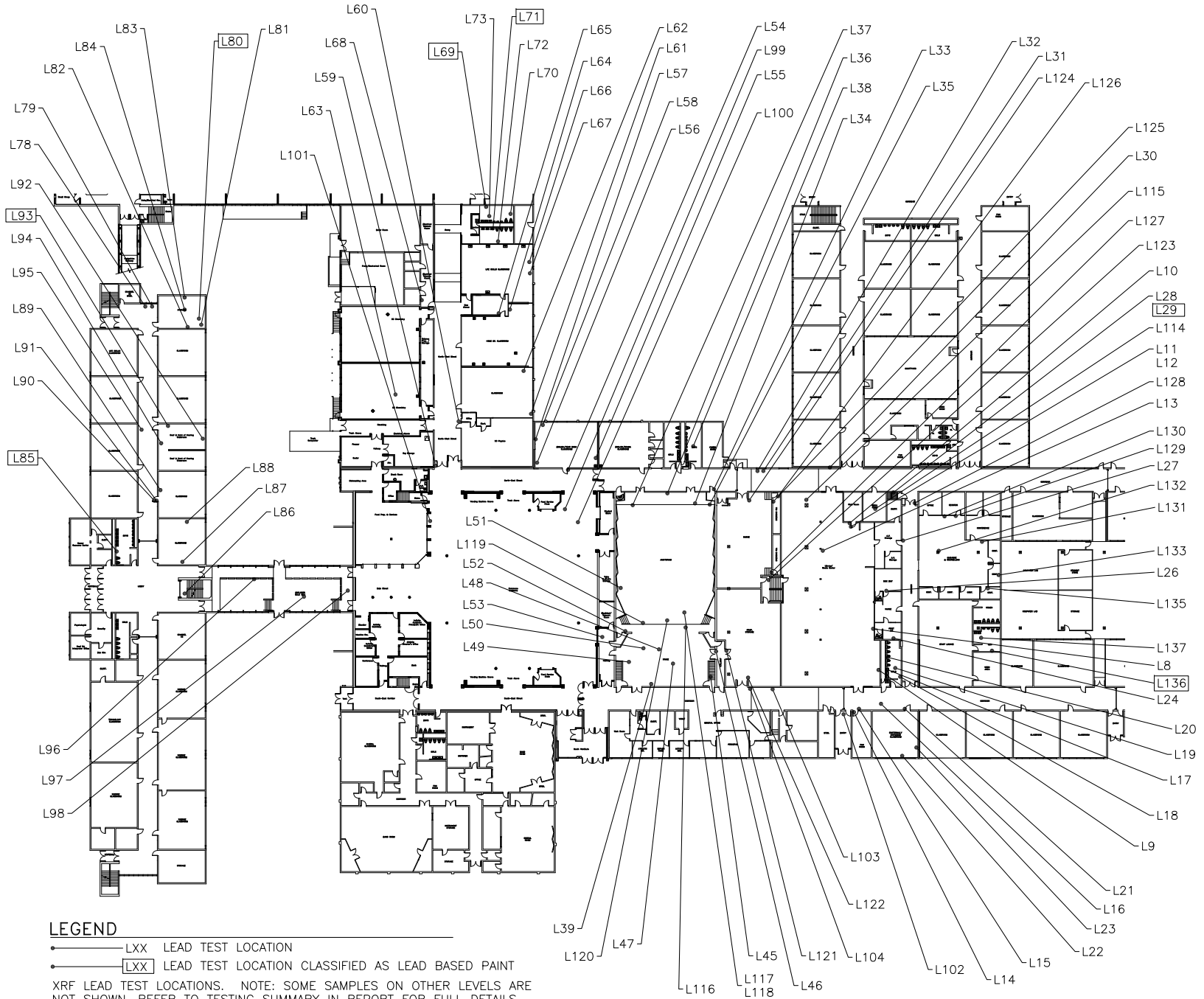
SHEET NO.
 9 OF
 10

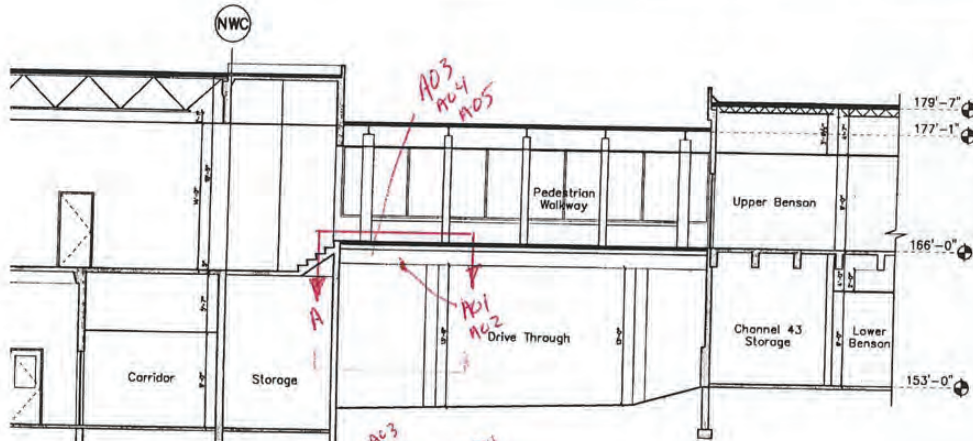


EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

LEAD TEST LOCATIONS
 FEBRUARY & MARCH 2002
 2/08, 2/19/2002
 CADD FILE: 5646-S10

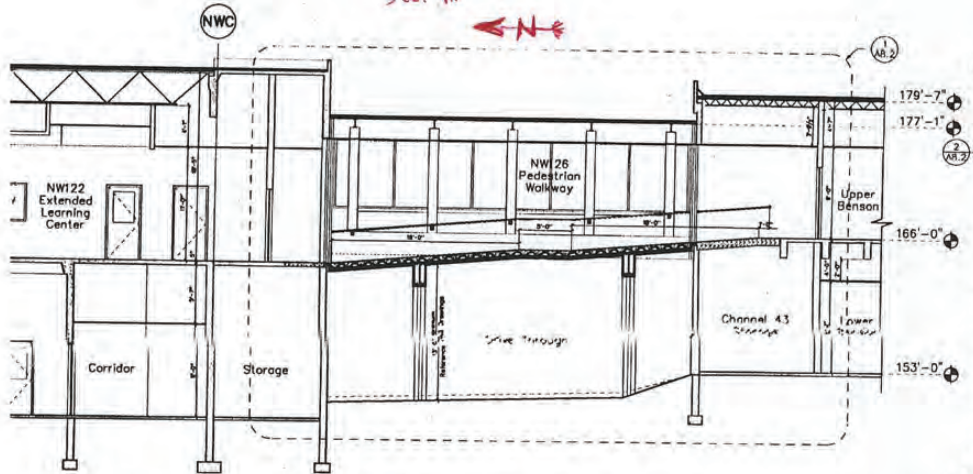
SHEET NO.
 10
 OF
 10



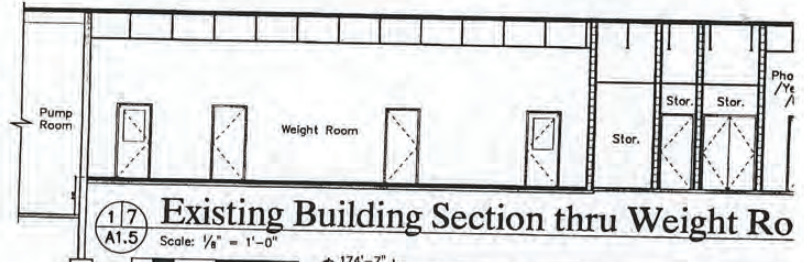


Bridge - Area 5 & 4

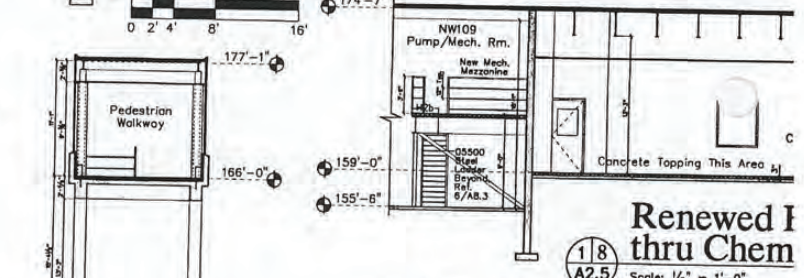
Samples collected on 06/26/2002 and have an EHS62602 prefix. EHS-5554



Extended Learning, & Bridge - Area 5 & 4

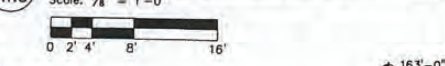


Existing Building Section thru Weight Ro

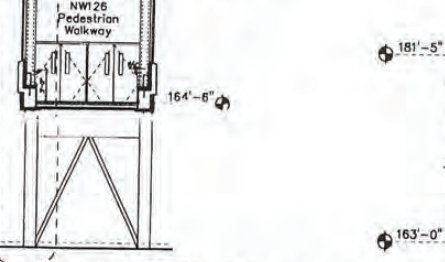


Renewed I thru Chem

Existing Building Section thru Bridge - Area 5

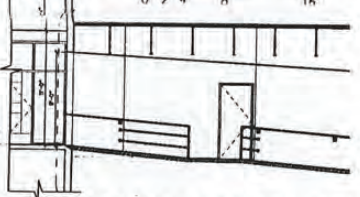


Existing Building Section thru Bridge - Area 5

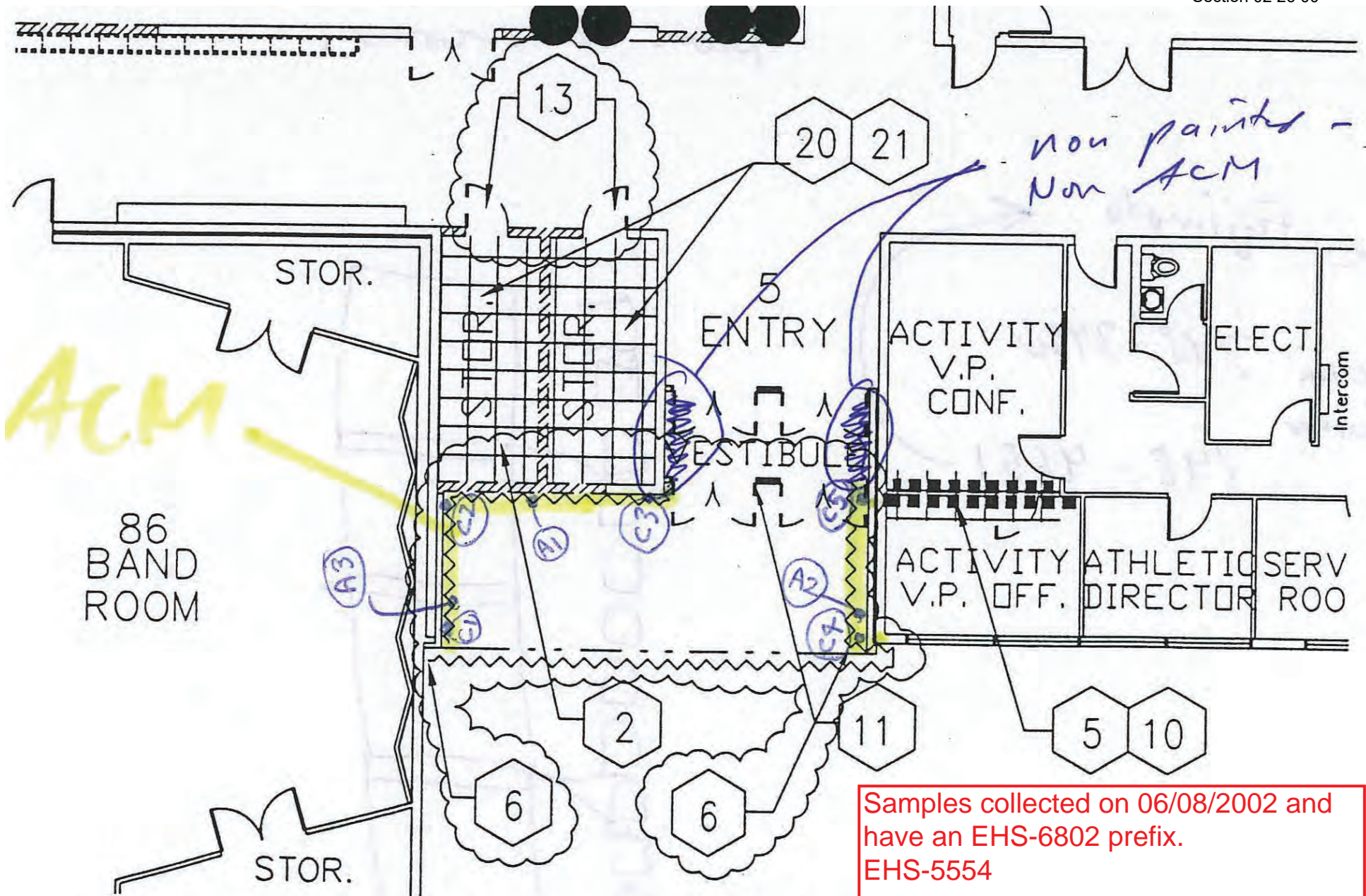


Renewed Building Section thru Bridge - Area 5

Existing buil



Renewed Buil



South Entry Abatement

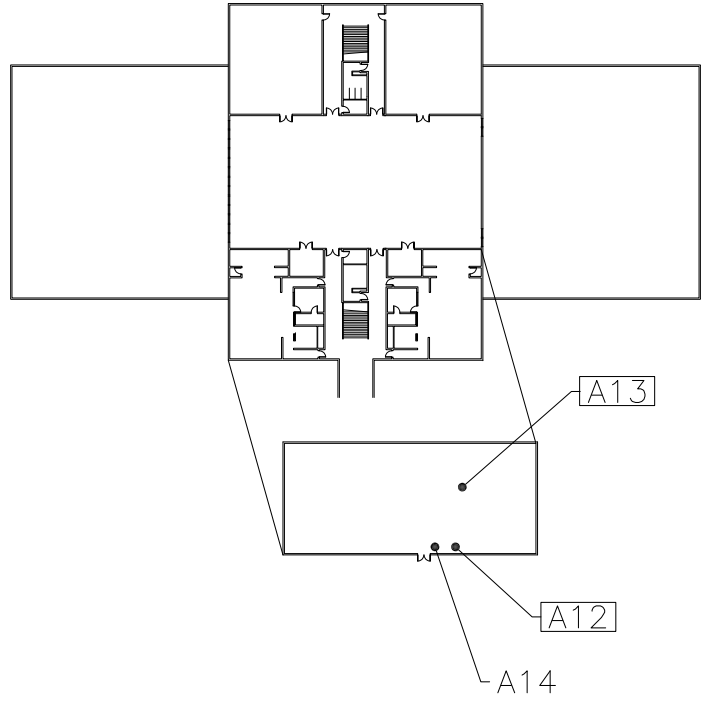
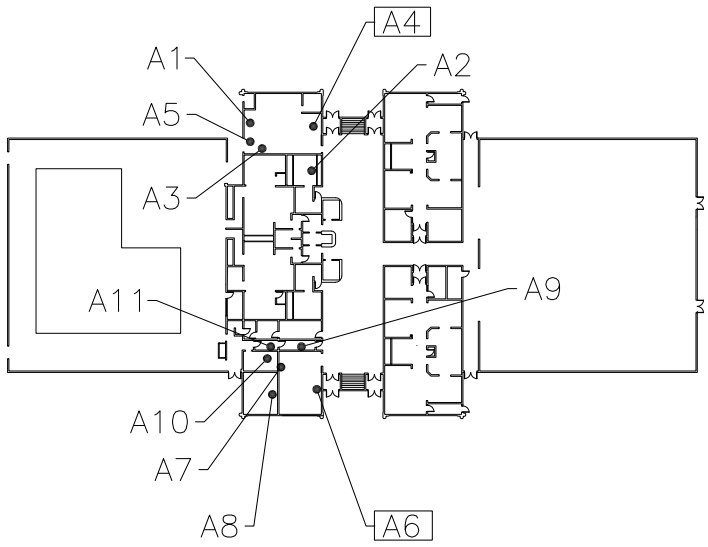


ANCHORAGE SCHOOL DISTRICT
 INSPECTED BY EHS-ALASKA, INC.
 INSPECTOR: ROBERT A. FRENCH
 PHONE # 694-1383

EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

ASD POOL ENERGY METERING
 ASBESTOS SAMPLE LOCATIONS
 INSPECTED: 4/19/01
 OADD FILE: 55025A1

SHEET NO.
 1
 OF
 1



LEGEND

- — AXX ASBESTOS SAMPLE LOCATION
- — [AXX] SAMPLE LOCATIONS WHICH CONTAINED ASBESTOS

ALL SAMPLE NUMBERS ARE PRECEDED BY THE PREFIX EB401



EAST ANCHORAGE HIGH
4025 E. NORTHERN LIGHTS
ANCHORAGE, ALASKA

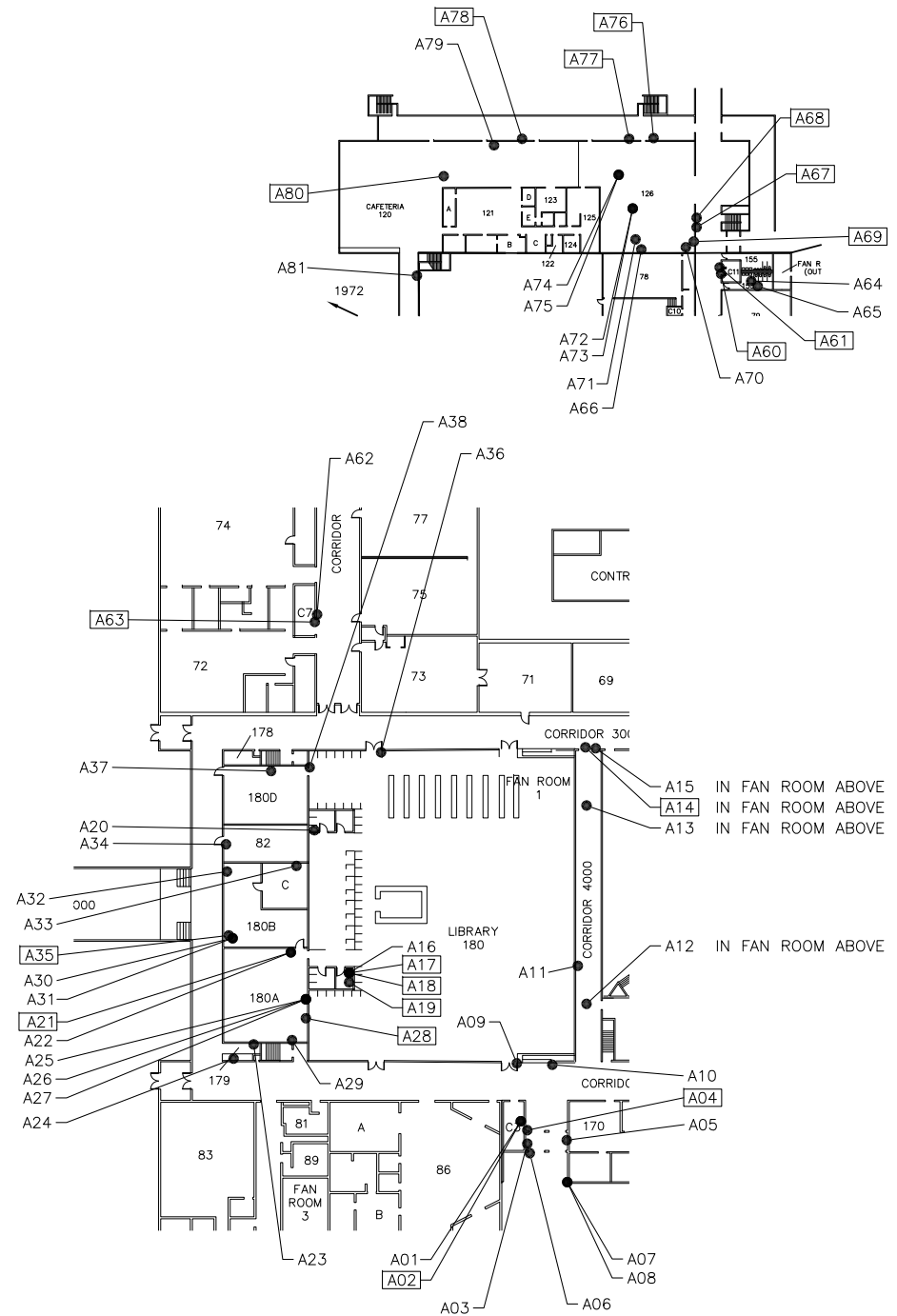
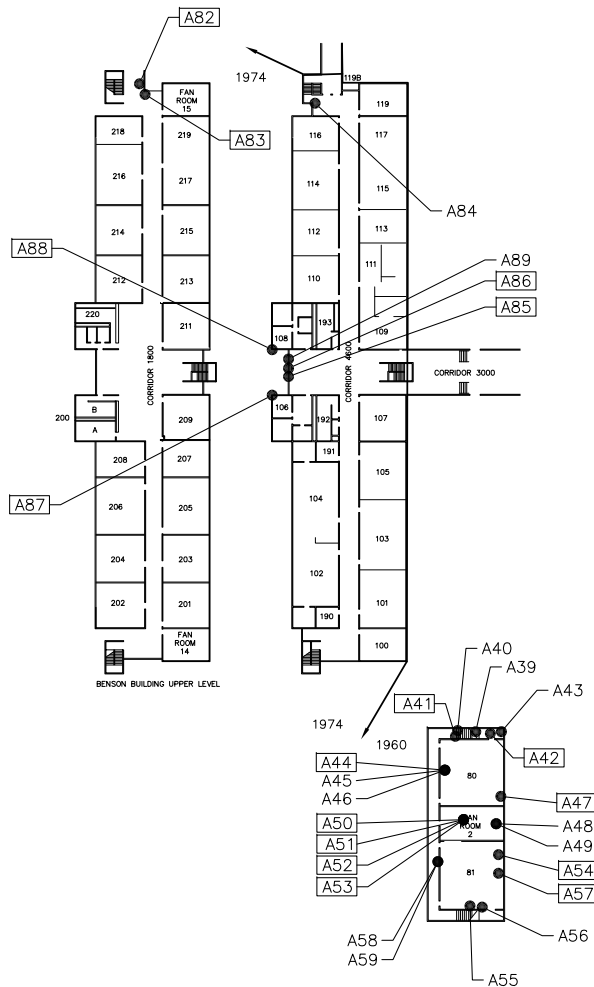
SAMPLE LOCATIONS
JULY 2000
INSPECTED: 7/26/00 AND 7/27/00
CADD FILE: 5350-S1.DWG

SHEET NO.
1 OF 4

LEGEND

- — AXX ASBESTOS SAMPLE LOCATION
- — [AXX] SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS

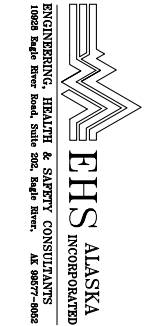
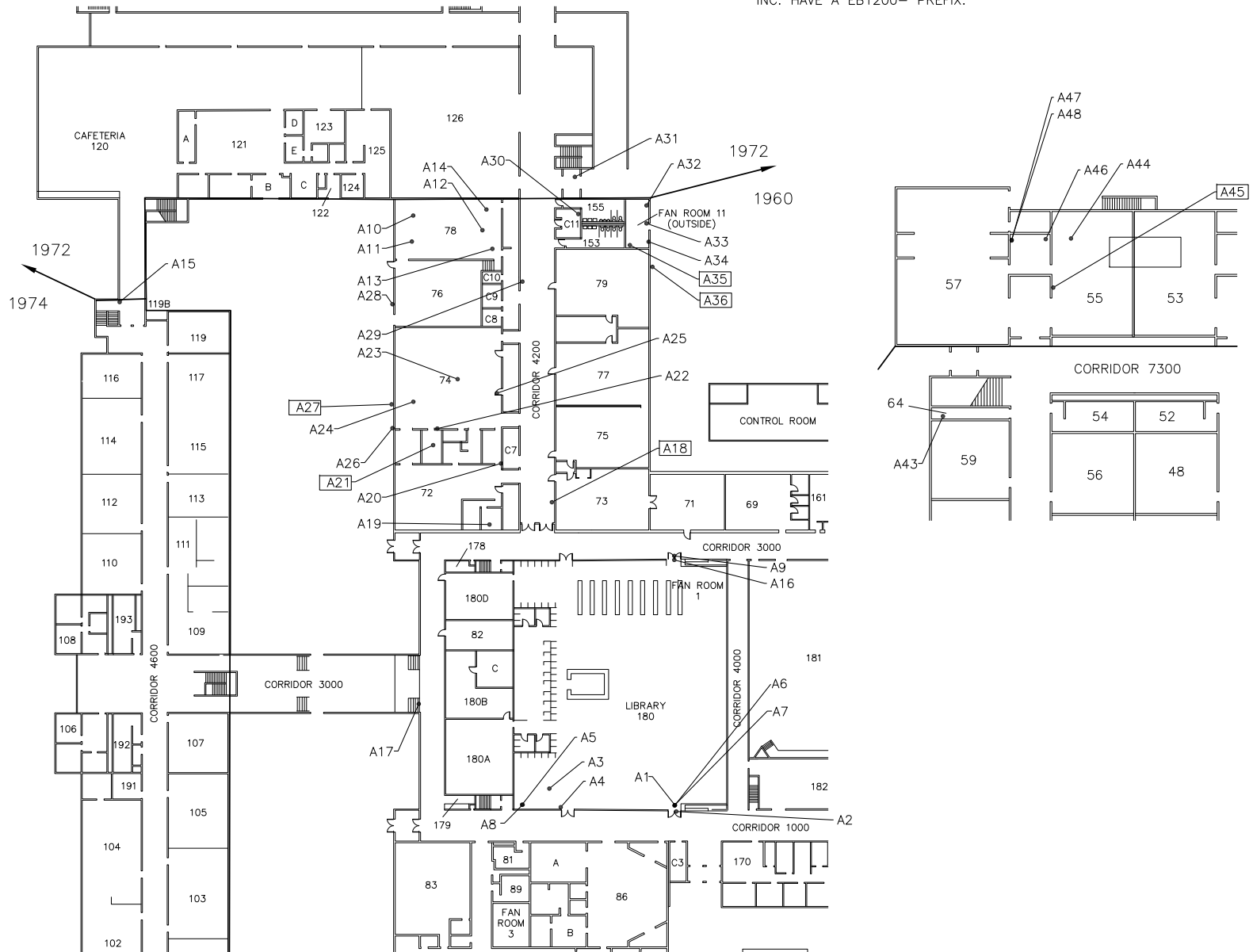
BULK ASBESTOS SAMPLES TAKEN IN JULY 2000 BY EHS-ALASKA, INC. HAVE A EB700- PREFIX.



LEGEND

- AXX ASBESTOS SAMPLE LOCATION
- [AXX] SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS

BULK ASBESTOS SAMPLES TAKEN IN DECEMBER 2000 BY EHS-ALASKA, INC. HAVE A EB1200- PREFIX.



EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

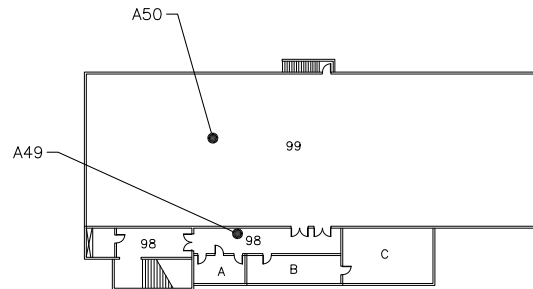
SAMPLE LOCATIONS
 DECEMBER 2000
 INSPECTED: 12/10/00 AND 12/16/00
 CADD FILE: 5350-S2.DWG

SHEET NO.
 2 OF 4

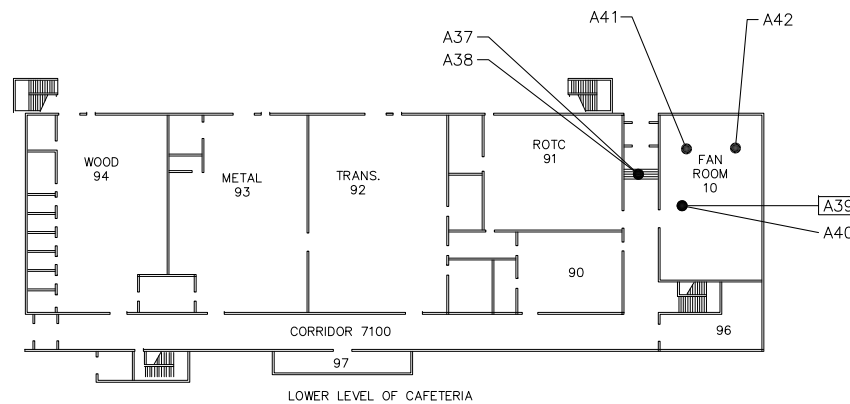
LEGEND

- AXX ASBESTOS SAMPLE LOCATION
- AXX SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS

BULK ASBESTOS SAMPLES TAKEN IN DECEMBER 2000 BY EHS-ALASKA, INC. HAVE A EB1200- PREFIX.



LOWER LEVEL RIFLE & ARCHERY RANGE



LOWER LEVEL OF CAFETERIA



EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

SAMPLE LOCATIONS
 DECEMBER 2000
 INSPECTED: 12/10/00 AND 12/16/00
 CADD FILE: 5350-S3.DWG

SHEET NO.
 3 OF
 4



EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

SAMPLE LOCATIONS
 JANUARY 2001 AND FEBRUARY 2001
 INSPECTED: 1/27&28/01 AND 2/6/01
 CADD FILE: 5350-S4.DWG

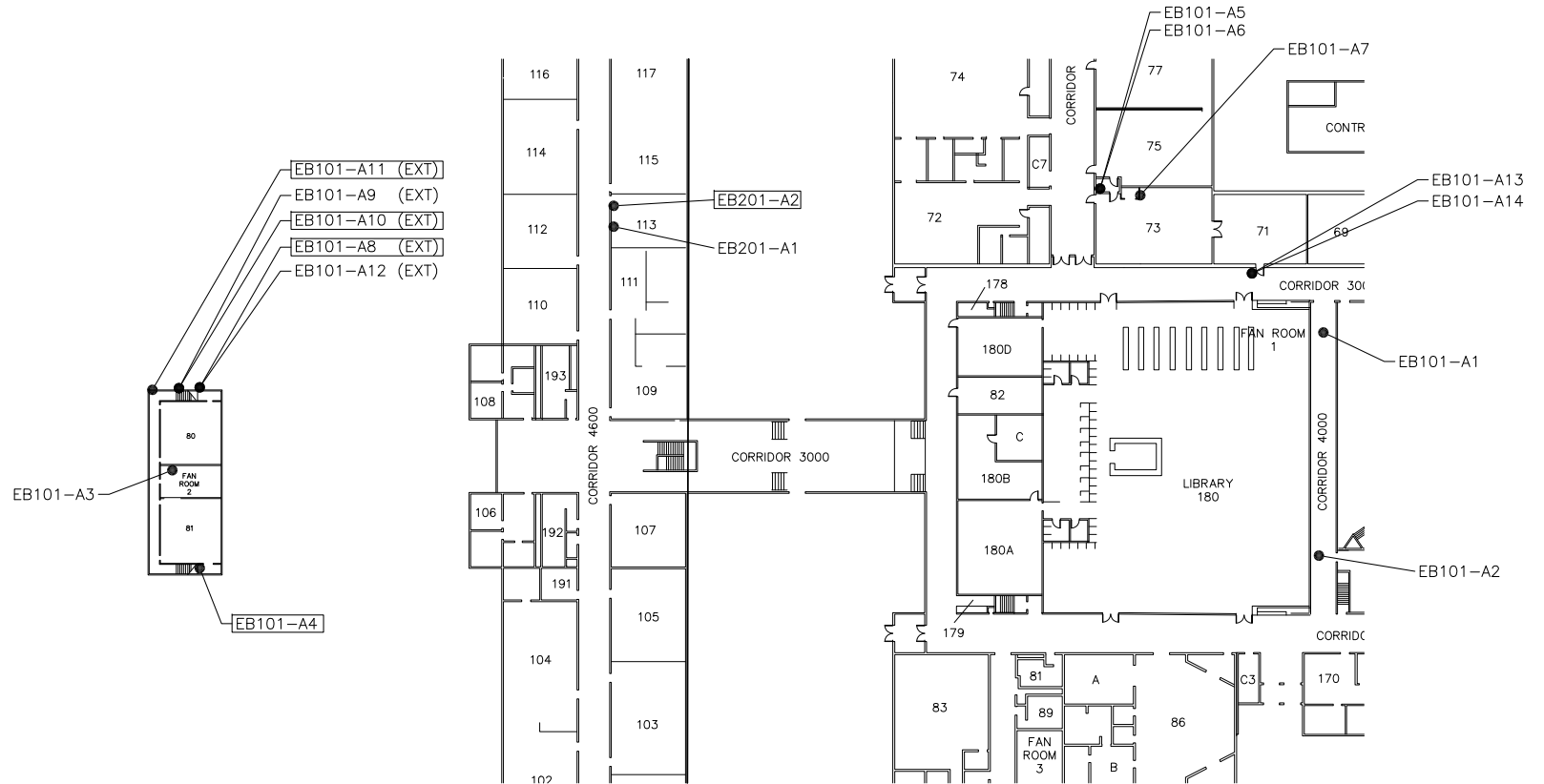
SHEET NO.
 4 OF 4

LEGEND

- AXX ASBESTOS SAMPLE LOCATION
- [AXX] SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS

BULK ASBESTOS SAMPLES TAKEN IN JANUARY 2001 BY EHS-ALASKA, INC. HAVE A EB101- PREFIX.

BULK ASBESTOS SAMPLES TAKEN IN FEBRUARY 2001 BY EHS-ALASKA, INC. HAVE A EB201- PREFIX.





EAST ANCHORAGE HIGH
4025 E. NORTHERN LIGHTS
ANCHORAGE, ALASKA

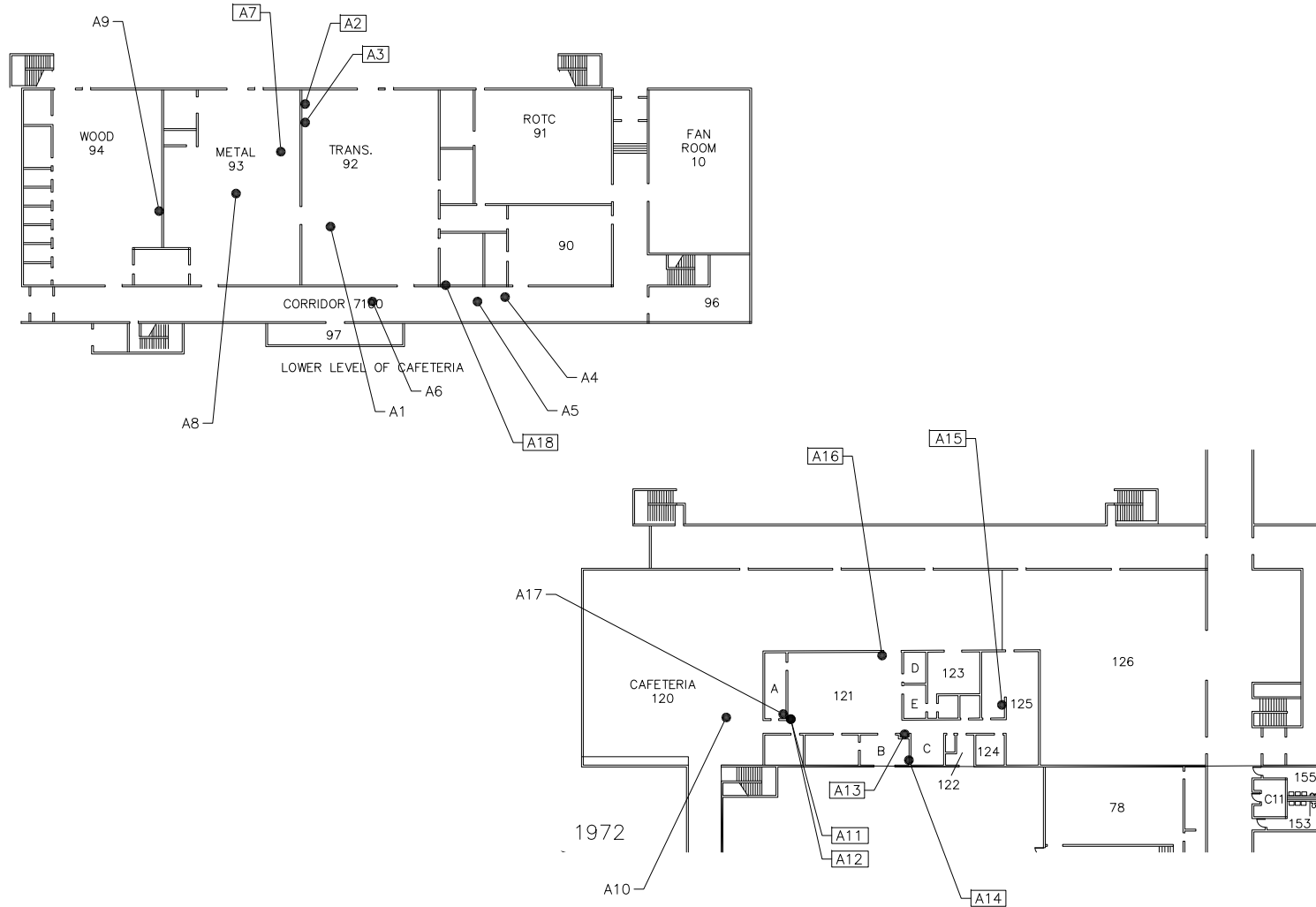
SAMPLE LOCATIONS
MAY 2000
INSPECTED: 5/18/00 AND 5/19/00
CADD FILE: 53245-1.DWG

SHEET NO.
1 OF 5

LEGEND

- AXX ASBESTOS SAMPLE LOCATION
- [AXX] SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS

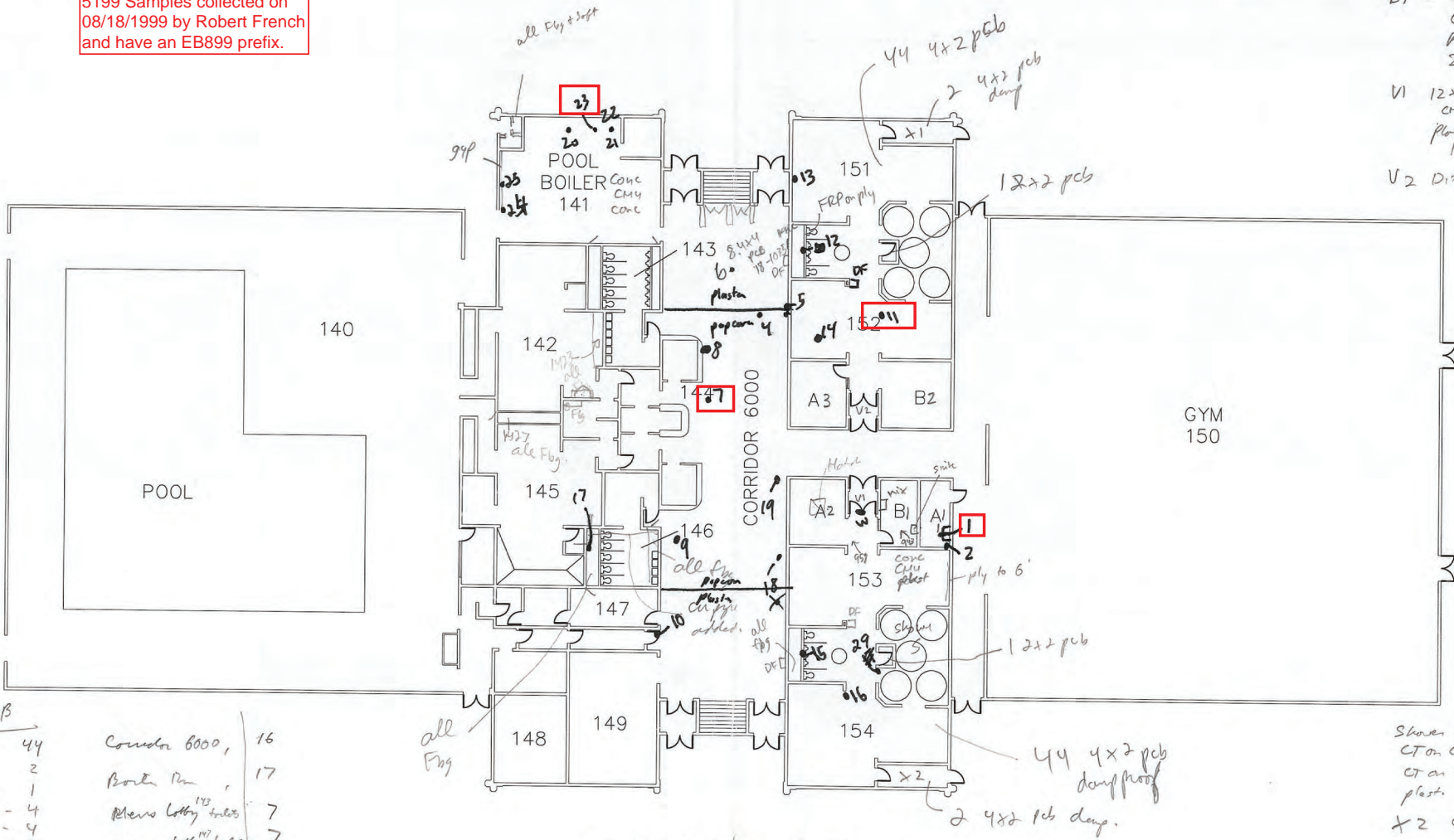
BULK ASBESTOS SAMPLES TAKEN IN MAY 2000 BY EHS-ALASKA, INC. HAVE A EB500- PREFIX.



5199 Samples collected on
 08/18/1999 by Robert French
 and have an EB899 prefix.

was artin vents
 looks like adolition
 plaster walls -
 CT varies to 4'
 lucards

- A1 = conc CMU plaster
2 100' PCB
- B1 = Comp / conc - yel
CMU
Plast.
2 - 4x3 PCB
- V1 12x12 conc
CMU
Plast.
1 4x4 PCB
- V2 D/H



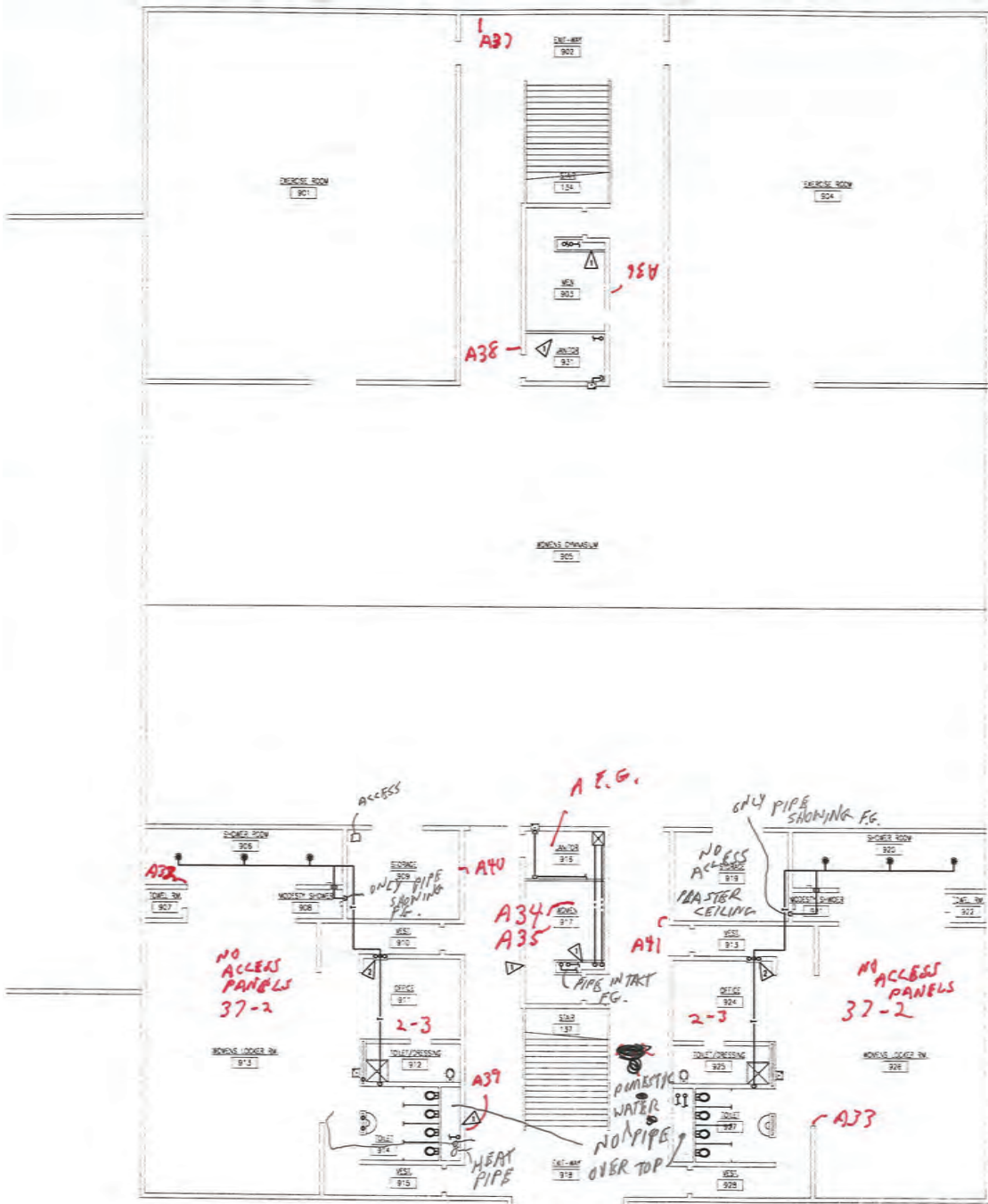
PCB	Location	Count
N - 44	Corridor 6000	16
N - 2	Boiler Rm	17
N - 1	Recess Lobby	7
B2 - 4	Women's Lobby	7
A3 - 4	Coaches	4
A1 - 2	Pool View	2
B1 - 2	149	12
V1+2 - 2		
Hall - 3		
A2 - 4		
S - 44		
S - 2		
S - 1		
		178

Shown South =
 CT on conc
 CT on CMU
 plaster
 X2 Conc CMU plaster



LOWER LEVEL (830-6)



Site Notes &
 PCB Count.

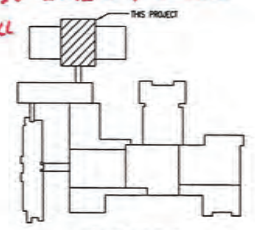


SHEET NOTES:

1. EXISTING PIPING TO BE REMOVED IS SHOWN BOLD FOR CLARITY
 2. EXISTING FIXTURES TO BE REUSED ARE SHOWN LITE. EXISTING FIXTURES TO BE REMOVED ARE SHOWN BOLD FOR CLARITY.
-  DEAD ALL PIPING IN PIPING CHASE UNLESS NOTED OTHERWISE.
 REUSE (E) WADING VALVE.

5199 Samples collected on 08/19/1999 by Robert Vaughn and have an EB899 prefix.

- EB899**
- A30 PIPE INSULATION
 - A31 FLANGE GASKET
 - A32 PLASTER
 - A33 PLASTER
 - A34 TOP LAYER PLASTER
 - A35 BOTTOM LAYER PLASTER
 - A36 2x4 LCT-1 STRAWS
 - A37 LCT-1
 - A38 LCT-1
 - 2x4 - A39 LCT-2 GALAXY
 - A40 LCT-2
 - 2x4 - A41 LCT-2 FISHERS CROSS PANEL



PLUMBING DEMOLITION PLAN - UPPER LEVEL

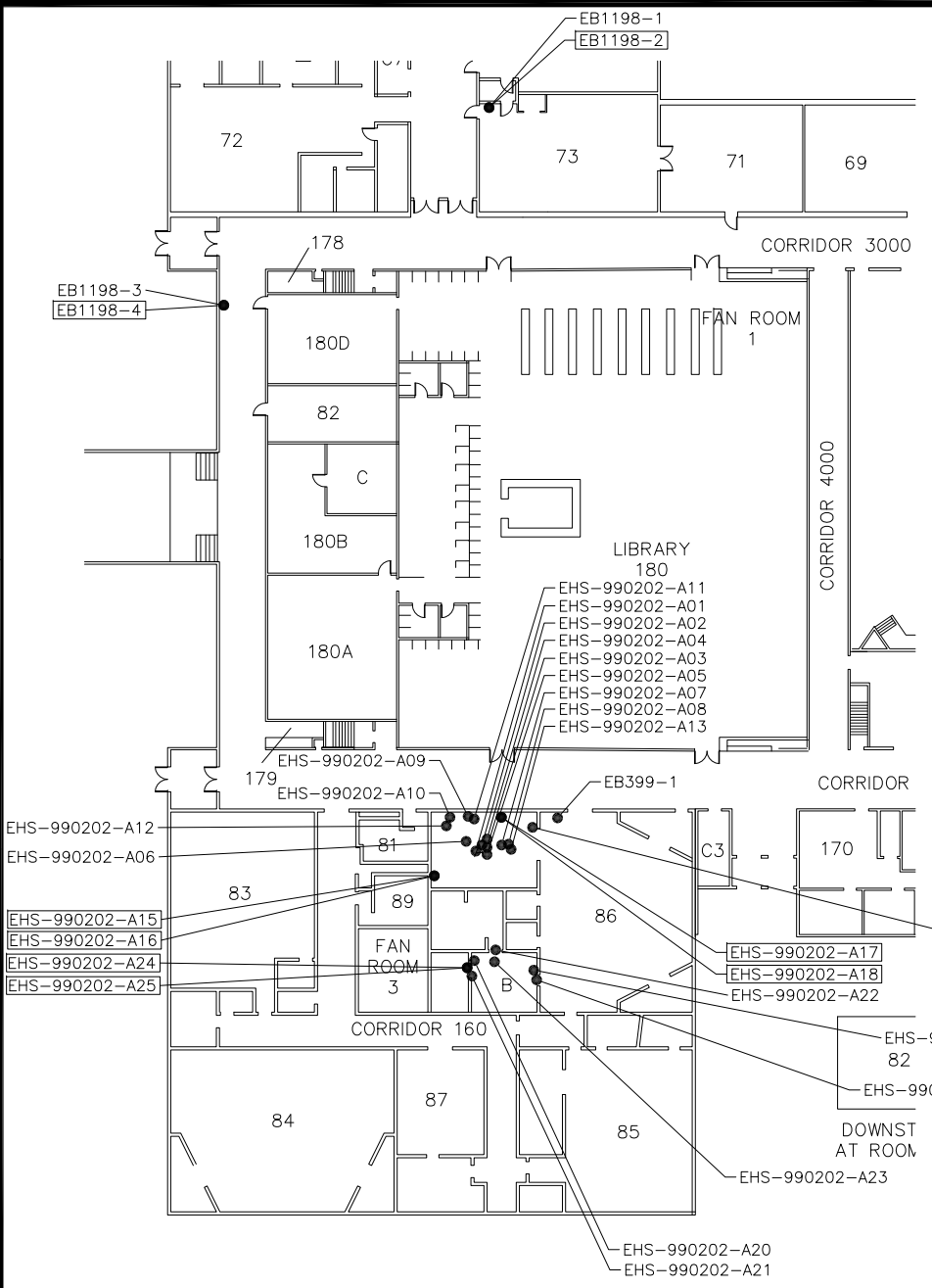


EHS ALASKA
 INCORPORATED
 ENGINEERING, HEALTH & SAFETY CONSULTANTS
 1008 Middle River Road, Suite 200, Middle River, AL 38077-0002
 INSPECTOR: SEE DATA SHEETS
 PHONE # 694-1383

EAST ANCHORAGE HIGH
 4025 E. NORTHERN LIGHTS
 ANCHORAGE, ALASKA

SAMPLE LOCATION PLAN
 INSPECTED: SEE DATA SHEETS
 CADD FILE: 5065S-1

SHEET NO.
 1
 OF
 1



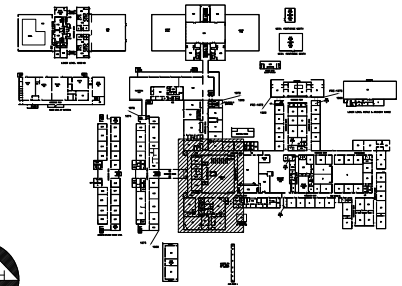
LEGEND

- XXXXXXXX ASBESTOS SAMPLE LOCATION
- XXXXXXXX SAMPLE LOCATIONS WHICH CONTAIN ASBESTOS

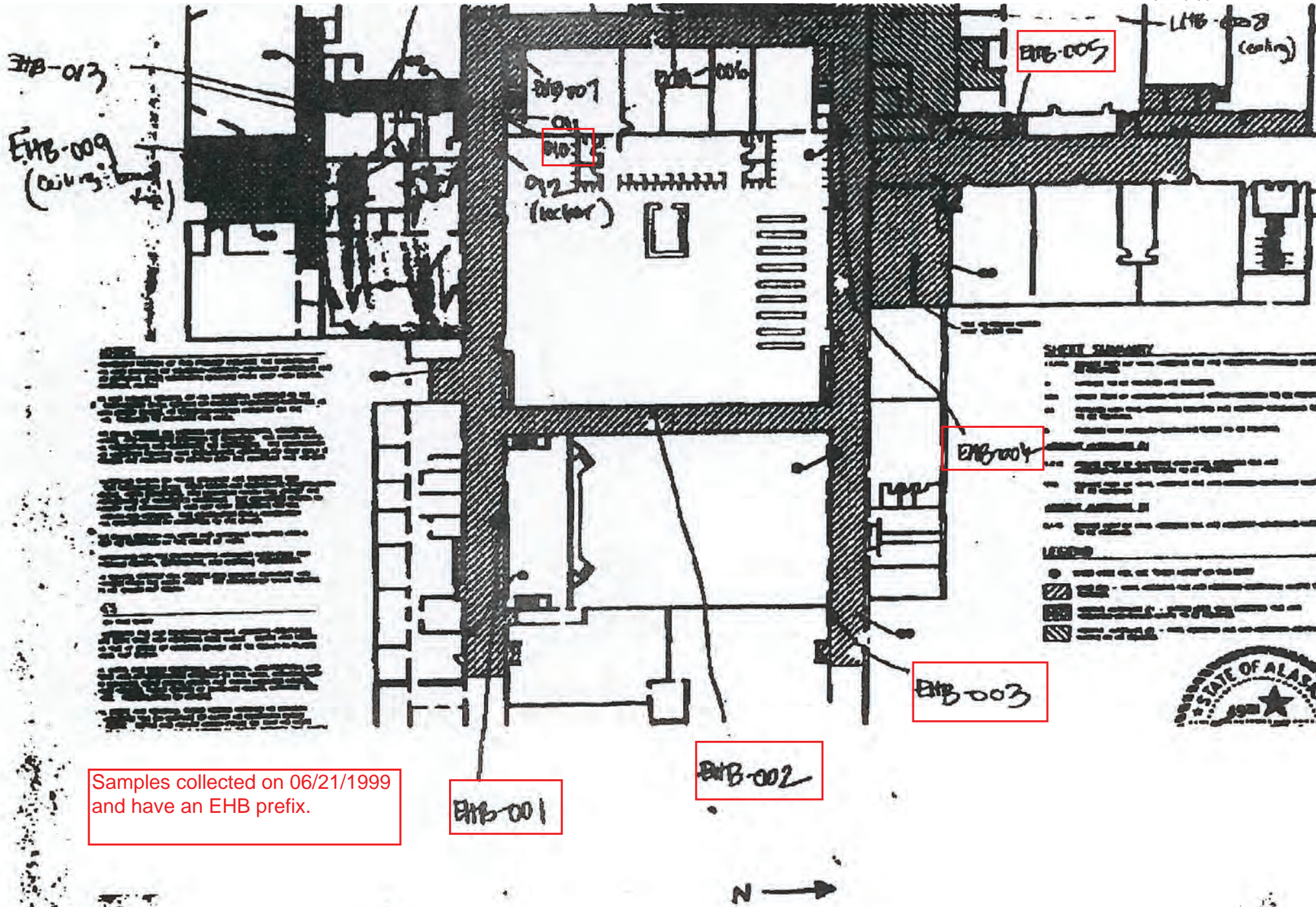
BULK ASBESTOS SAMPLES TAKEN NOVEMBER 17, 1998 BY EHS-ALASKA, INC. HAVE A EB1198- PREFIX.

BULK ASBESTOS SAMPLES TAKEN FEBRUARY 2, 1999 BY EHS-ALASKA, INC. HAVE A EHS-990202-A- PREFIX.

BULK ASBESTOS SAMPLES TAKEN MARCH 30, 1999 BY EHS-ALASKA, INC. HAVE A EB399- PREFIX.

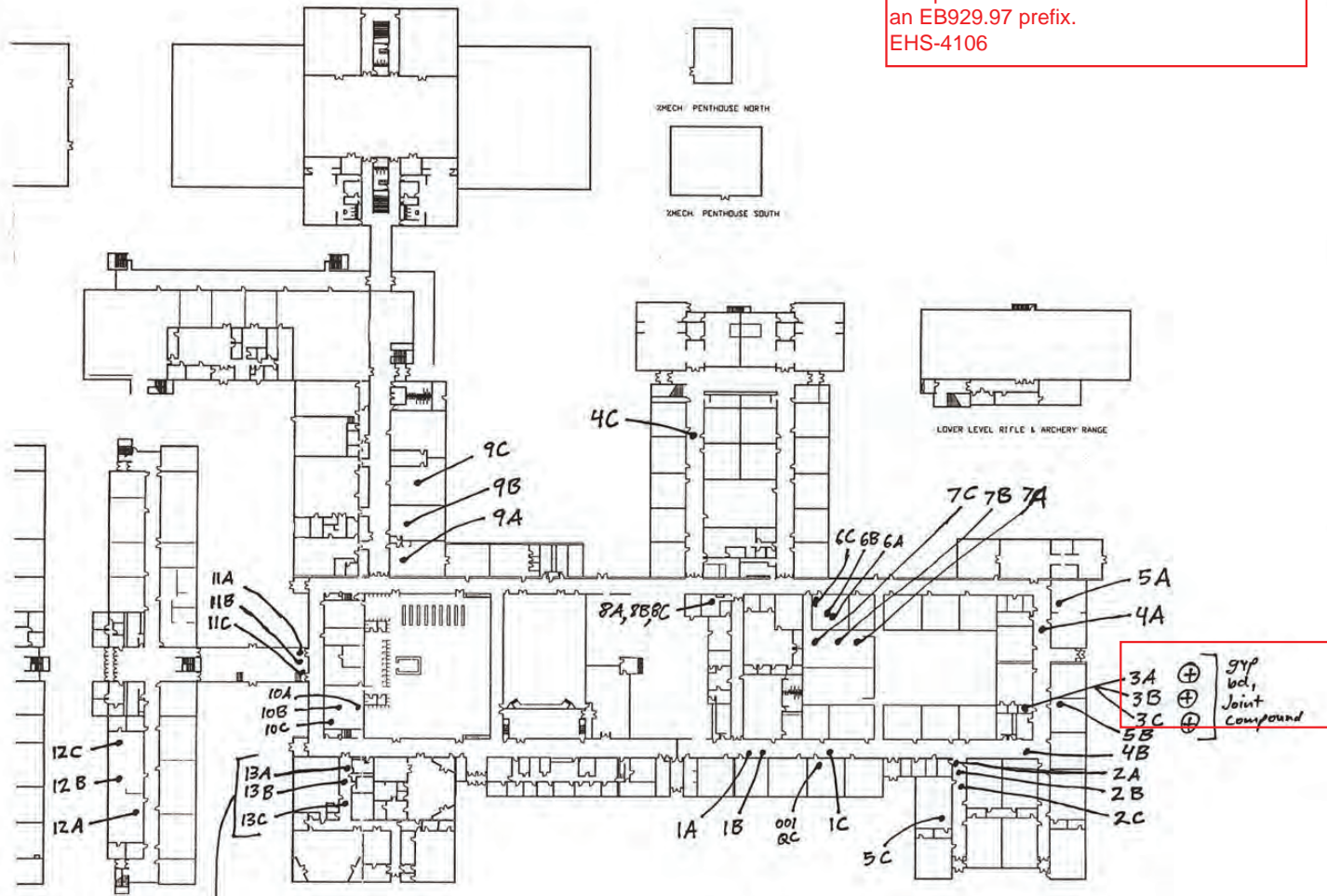


KEY PLAN



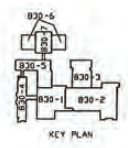
Samples collected on 06/21/1999 and have an EHB prefix.

Samples collected on 09/27/1997 and have an EB929.97 prefix. EHS-4106



sprayed-on ceiling Material - Not ACM

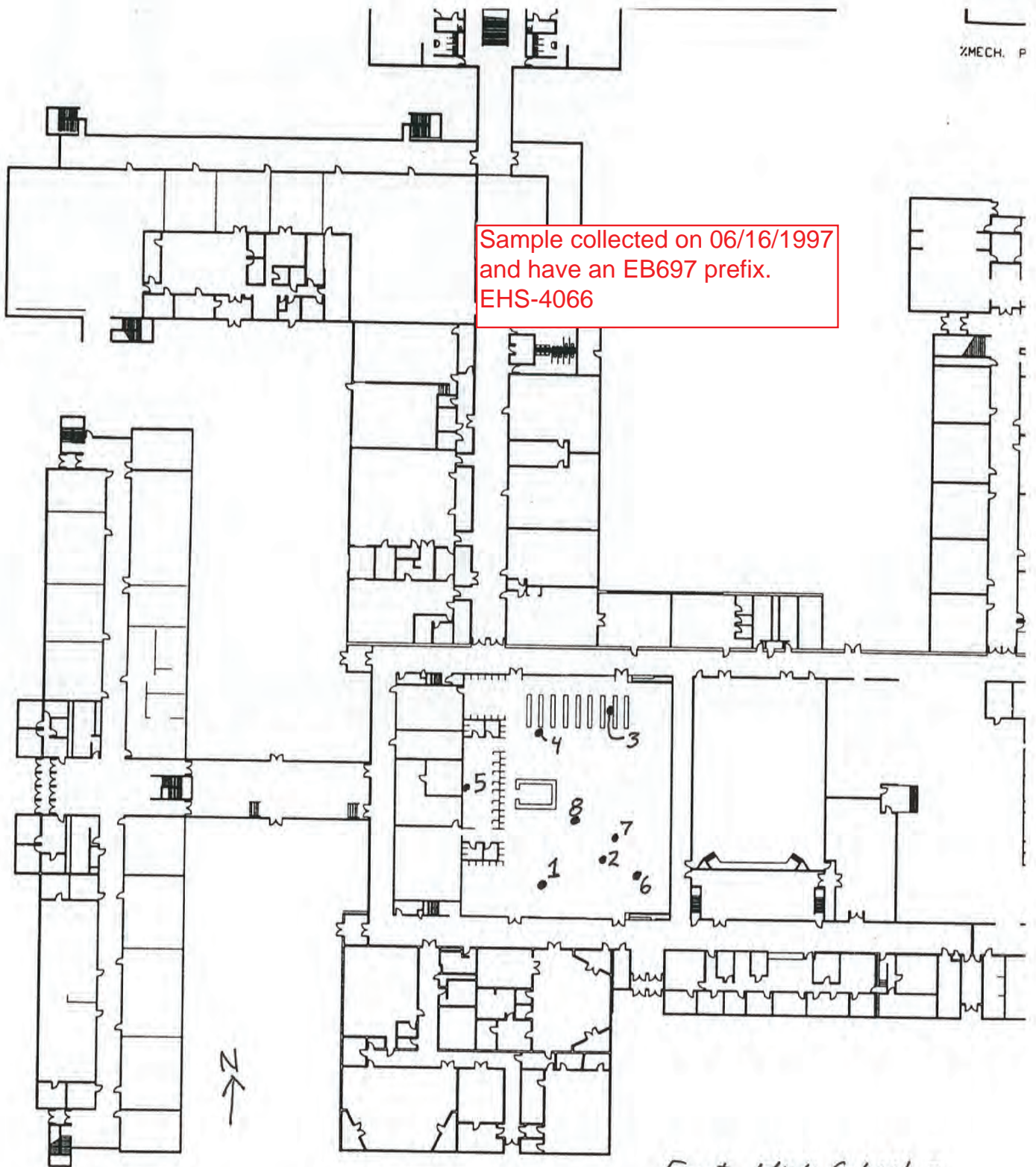
Bulk Sample locations
 Taken 9-29-97 by EHS-AK
 All samples have EB92997 - prefix
 ⇒ All ceiling tiles did not contain asbestos
 ⇒ 3 samples of joint compound contained 100% Asbestos in the joint compound



GRAPHIC SCALE

4106

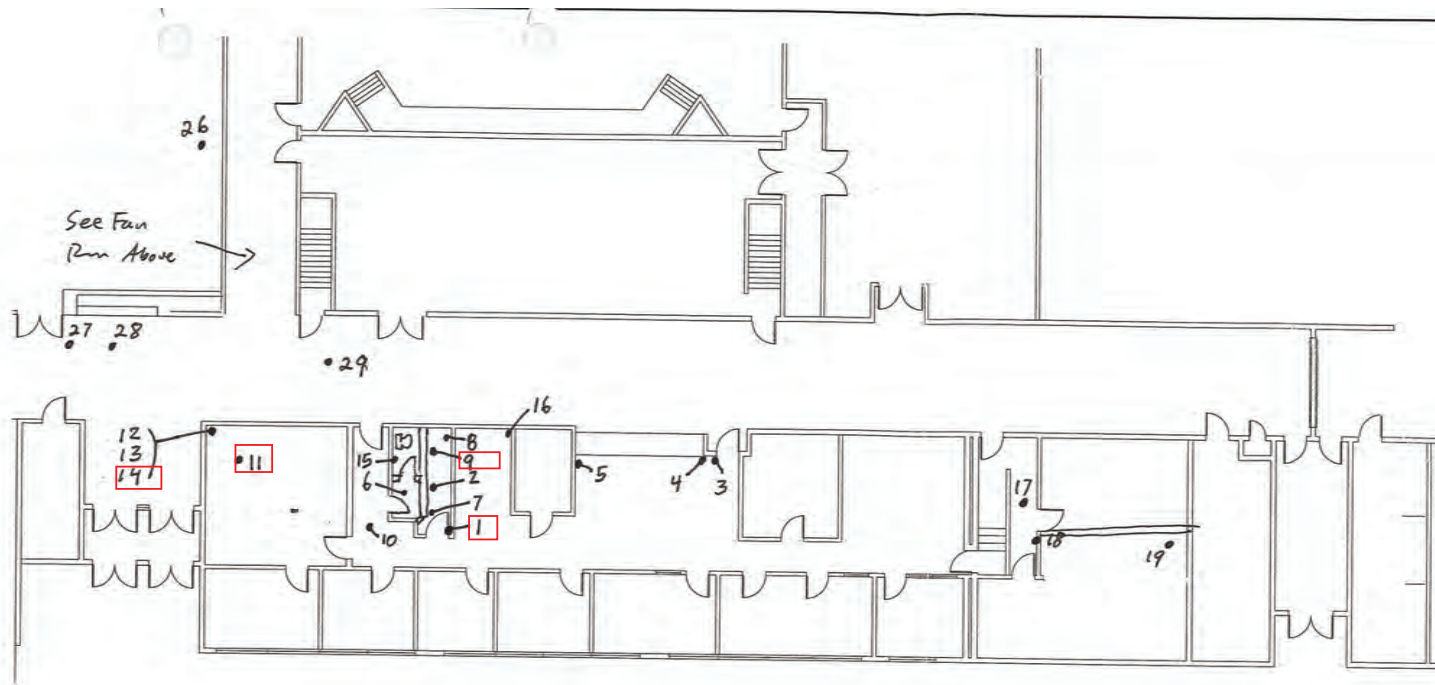
MECH. P



Sample collected on 06/16/1997
and have an EB697 prefix.
EHS-4066

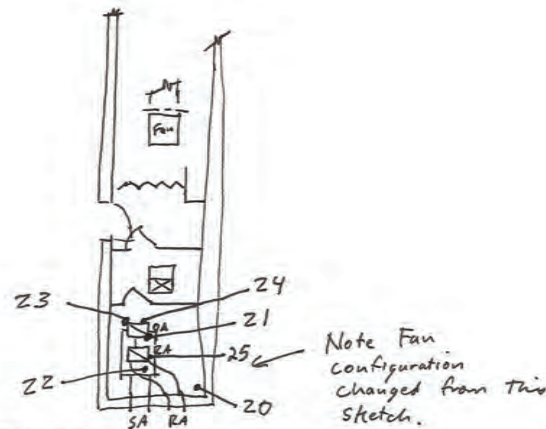
Sample #'s are prefixed
with EB697

East High School -
Bulk ceiling tile samples
taken 6-16-97 by Bob
French of EHS-Alaska
Library light replacement project



1 OFFICE SPACE CONSTRUCTION PLAN
102.2
 Not to Scale

Samples collected on 03/26/1997
 and have an EB397 prefix.
 EHS-4033



2 FAN ROOM CONSTRUCTION PLAN
102.2
 Not to Scale

Bulk Asbestos Sample Locations
 Taken 3-26-97 by Bob French
 of EHS-Alaska, Inc.

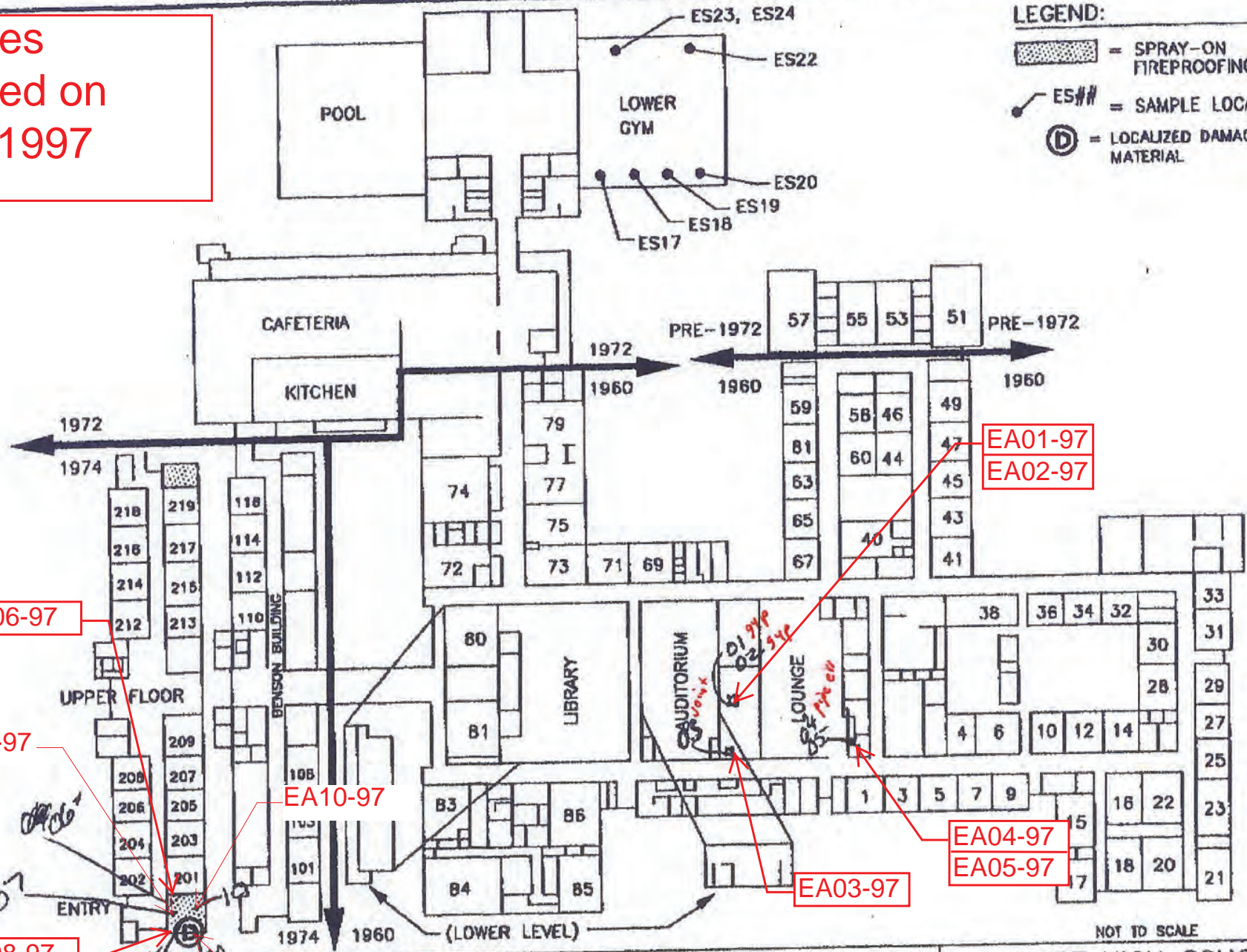
All sample numbers noted here are
 preceded by EB397-#

Refer to field data sheets for descriptions

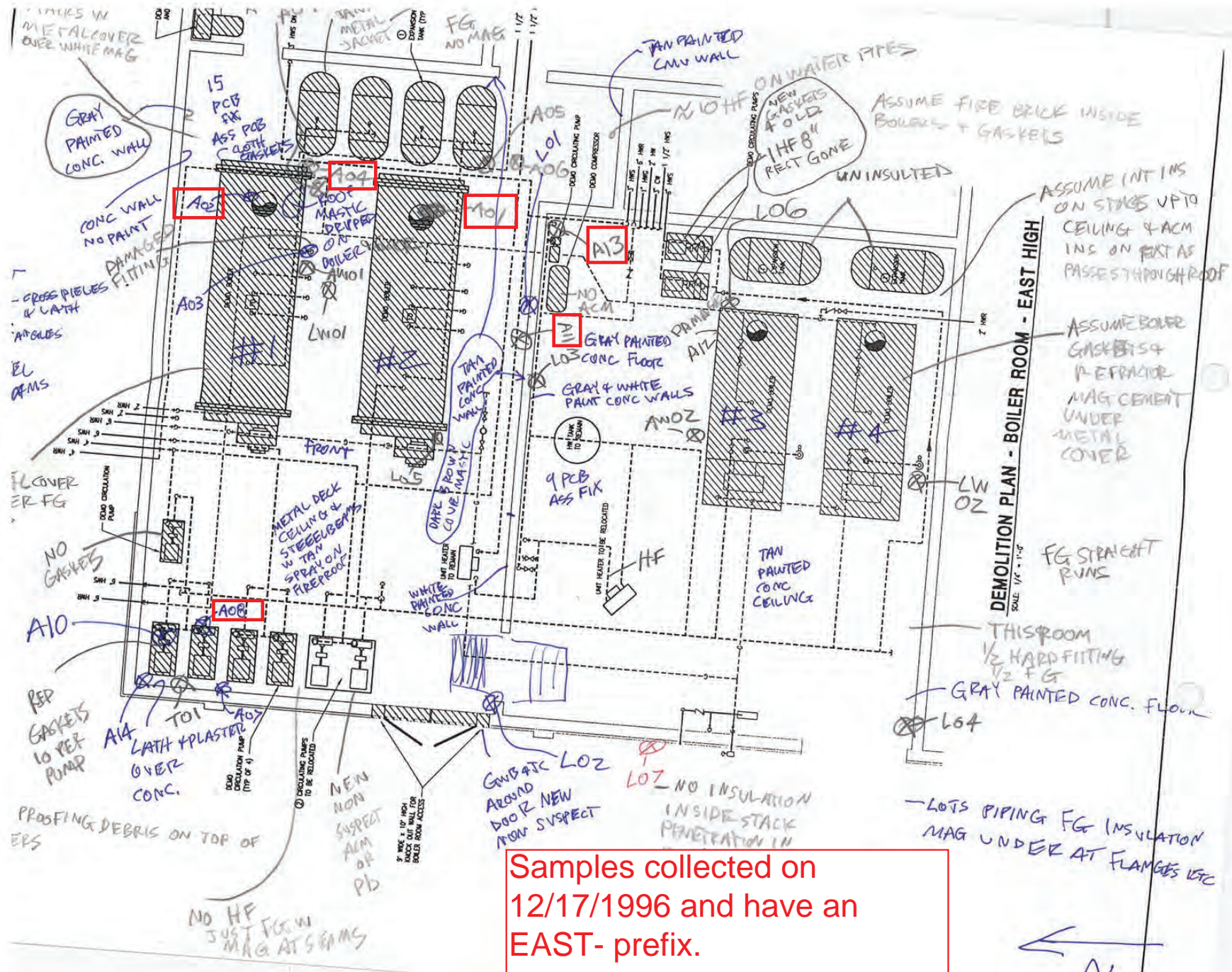
Samples collected on 02/11/1997

LEGEND:

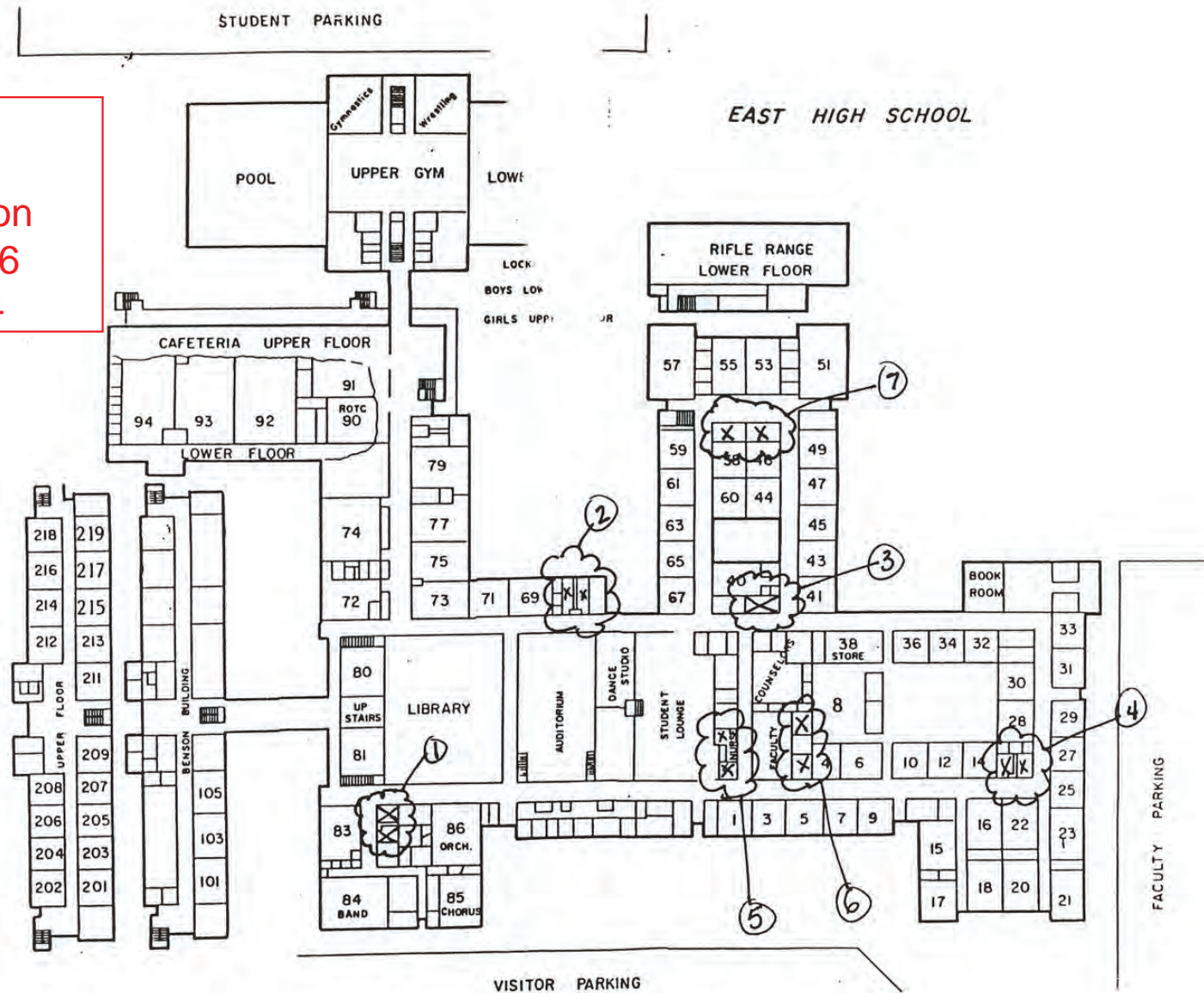
-  = SPRAY-ON FIREPROOFING
-  ES## = SAMPLE LOCATIONS
-  = LOCALIZED DAMAGED MATERIAL

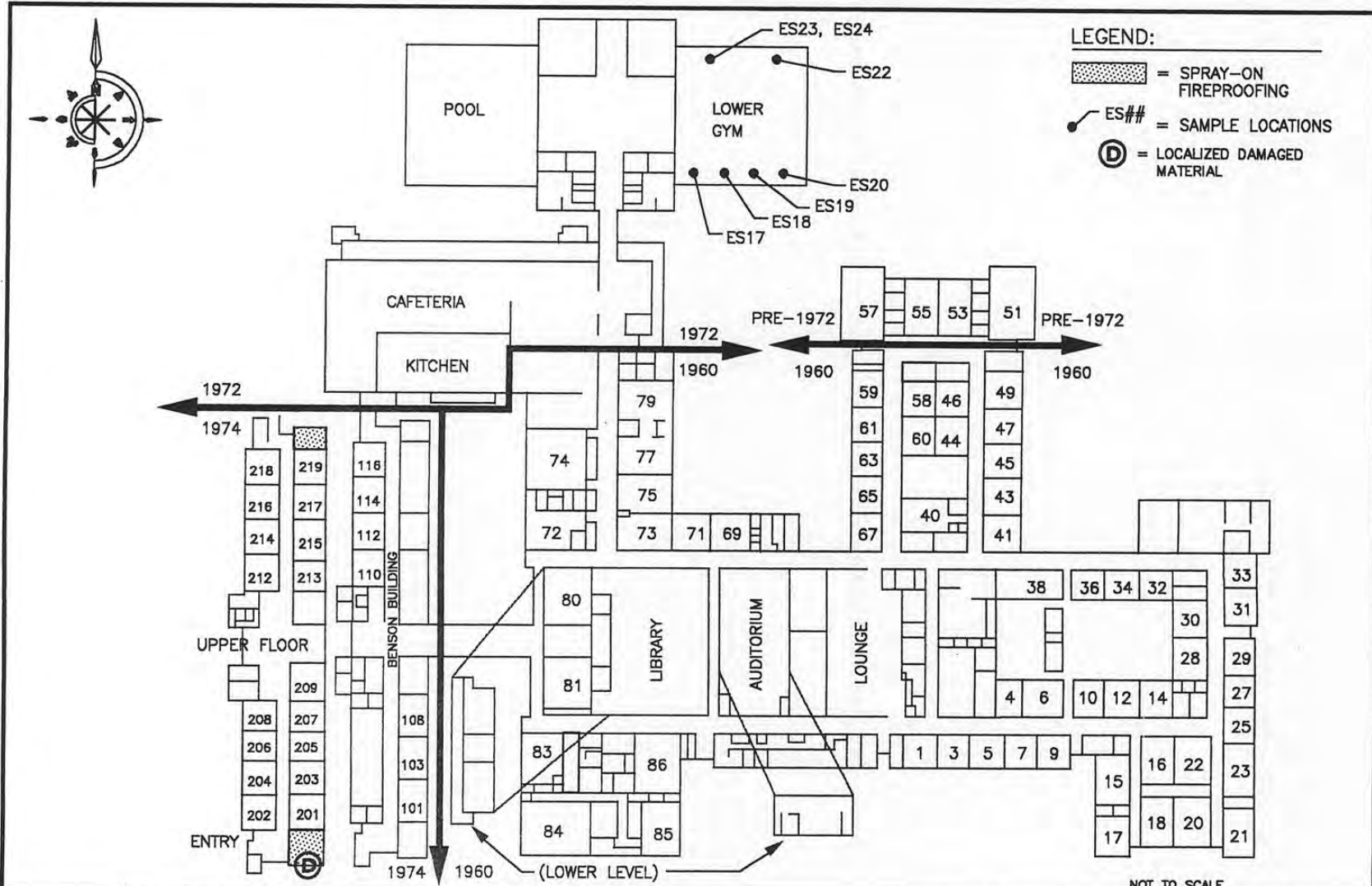


DESIGN: LAH

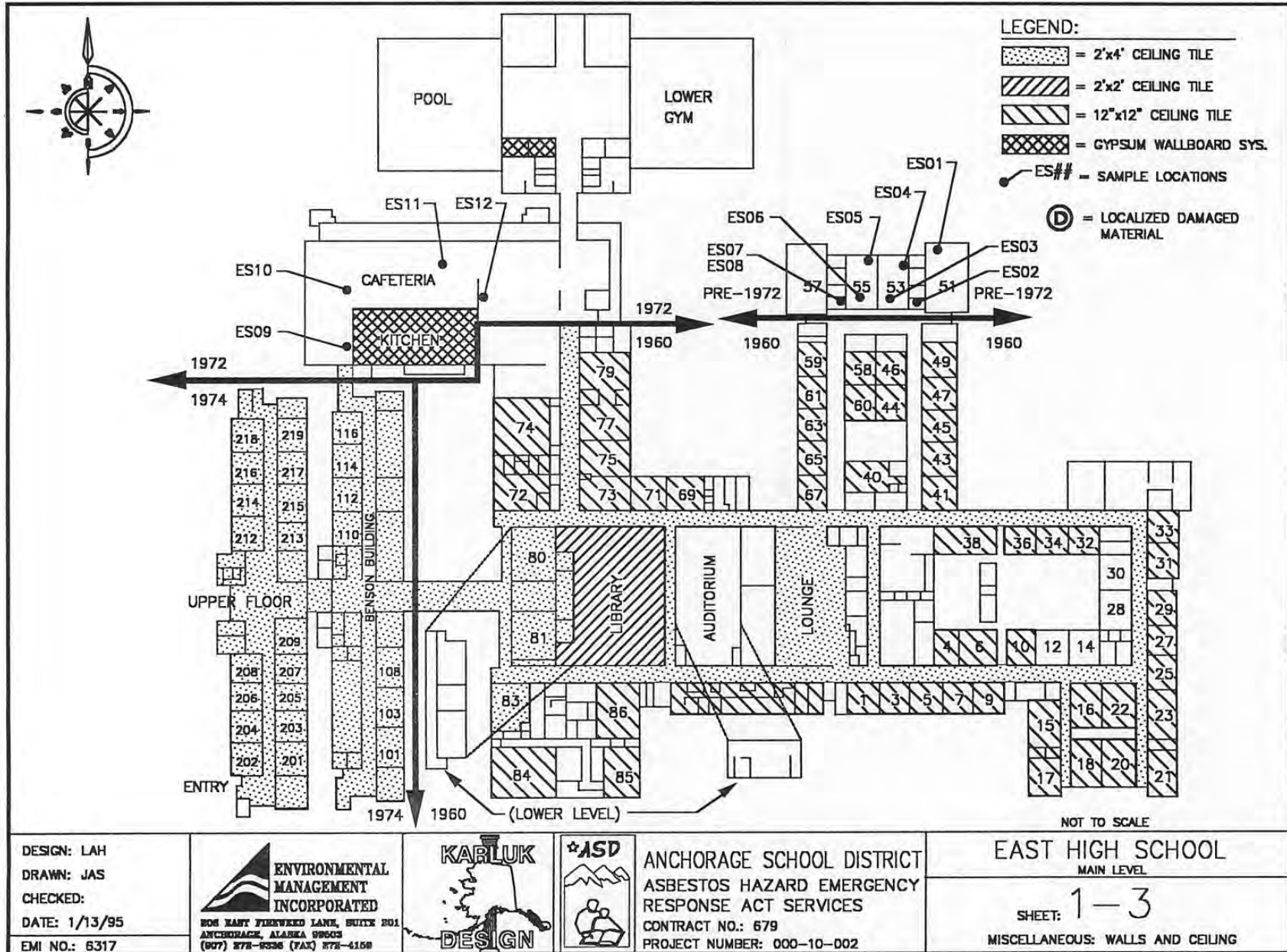


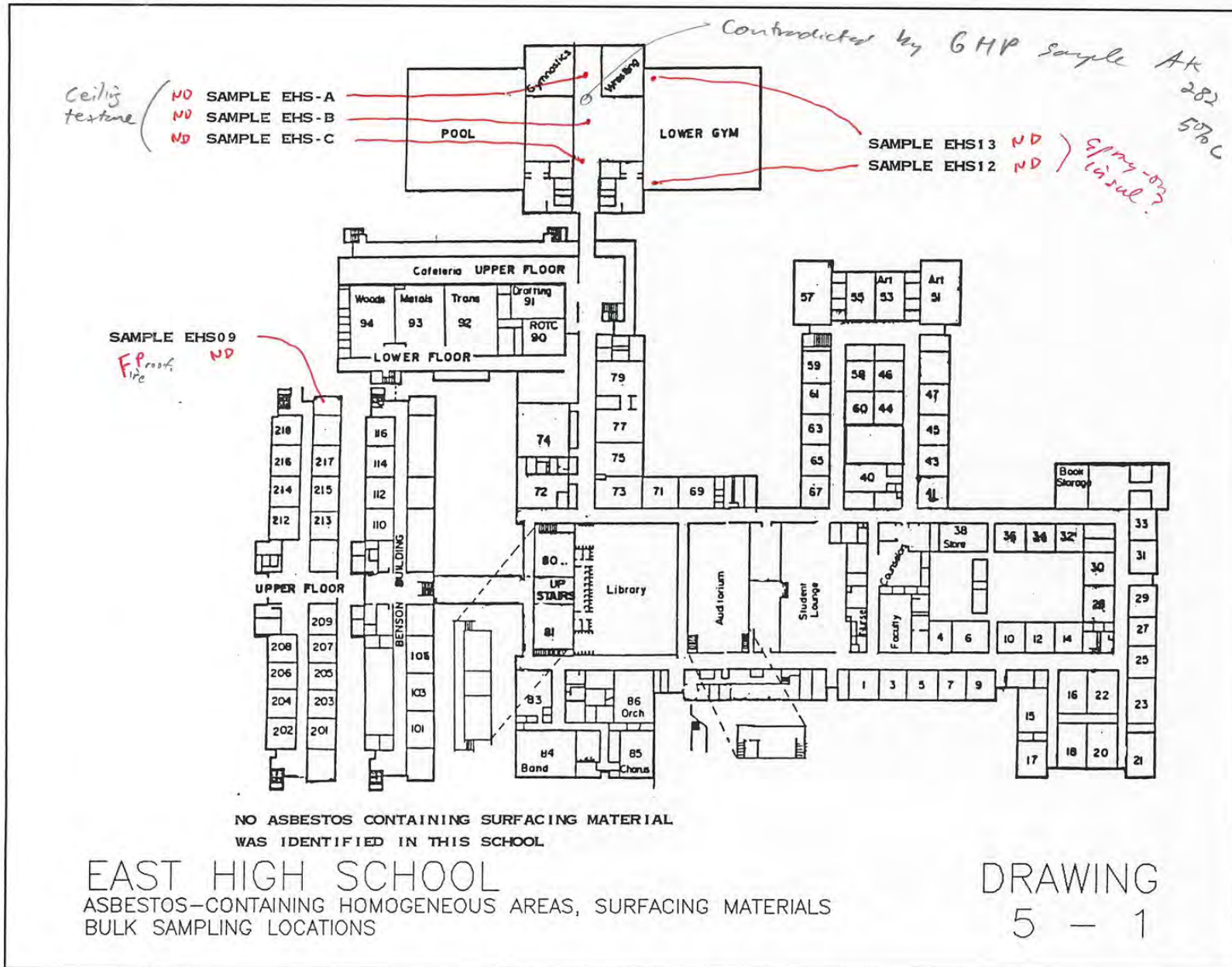
Key for
samples
collected on
08/15/1996
EHS-3924

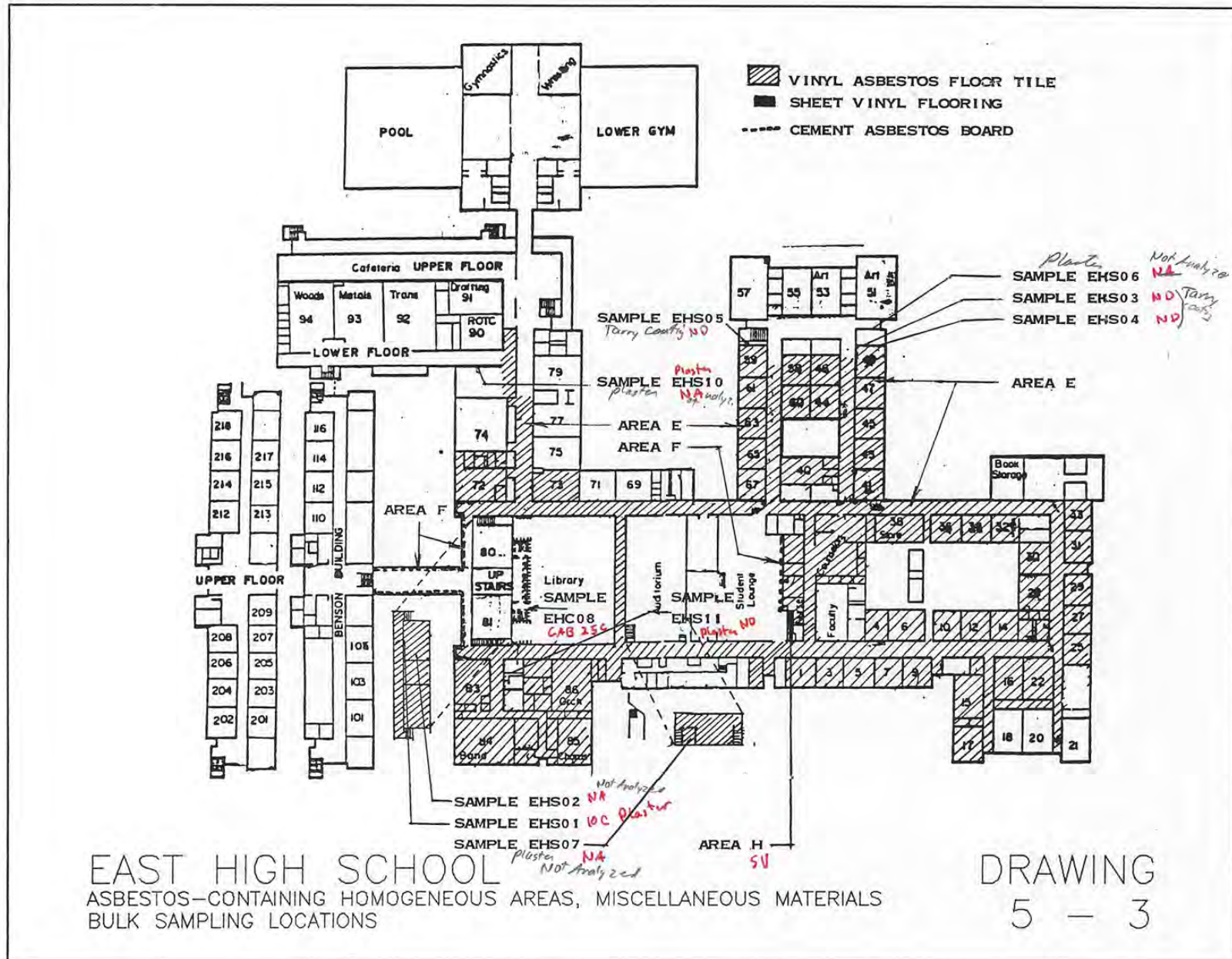




DESIGN: LAH DRAWN: JAS CHECKED: DATE: 1/13/95 EMI NO.: 6317	ENVIRONMENTAL MANAGEMENT INCORPORATED 806 EAST FIREWEED LANE, SUITE 201 ANCHORAGE, ALASKA 99503 (907) 272-9386 (FAX) 272-4169	KARLUK DESIGN	ASD ANCHORAGE SCHOOL DISTRICT ASBESTOS HAZARD EMERGENCY RESPONSE ACT SERVICES CONTRACT NO.: 679 PROJECT NUMBER: 000-10-002	EAST HIGH SCHOOL MAIN LEVEL SHEET: 1-1 SURFACING
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SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 SUMMARY

- A. Remove all designated and undesignated building components, equipment and fixtures as necessary to complete the Work.
- B. Cap and identify utilities.
- C. Removal and storage of items to be reinstalled upon completion of alteration and renovation work.

1.04 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.05 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.06 SUBMITTALS

- A. Submit demolition and removal procedures and schedule.
- B. Submit record drawings at end of project that reflect demolition findings.

1.07 EXISTING CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conduct demolition to minimize interference with adjacent building areas. Maintain protected egress and access at all times.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Provide, erect, and maintain temporary barriers and security devices.
- E. Except where noted otherwise, Contractor shall dispose of all removed material and equipment.
- F. Hazardous Materials: A report on the presence of hazardous materials follows this section. Examine report to become aware of locations where hazardous materials are present. Remove hazardous materials according to all current and applicable codes, regulations, rules, laws and ordinances, etc., by all OSHA, Federal, State, Municipal and Local entities and other Authorities having Jurisdiction.
 - 1. If suspected hazardous materials other than in the roof are encountered, do not disturb; immediately notify Owner's Representative. Unknown hazardous materials will be removed by Owner under a separate contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PREPARATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Protect existing items that are not required to be altered.
- C. Disconnect, remove, and cap designated and non-required utility services within demolition areas. Notify Owner minimum 24 hours prior to disconnection and removal of services.
- D. Mark location of disconnected utilities. Identify and indicate capping locations on Project Record Documents. See Drawings for antenna work and information.
- E. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- F. Coordinate roofing and project demolition with work of other Sections.

3.02 EXECUTION

- A. Demolish in an orderly and careful manner. Protect existing supporting structural members and building components to remain. Provide shoring, bracing and supports as required.

- B. Except where noted otherwise, immediately remove demolished materials from site.
- C. Remove materials to be re-installed or retained in a manner to prevent damage. Store and protect.
- D. Remove and promptly dispose of contaminated, vermin infested, or dangerous materials encountered.
- E. Do not burn or bury materials on site.
- F. Remove demolished materials from site as work progresses. Upon completion of work, leave areas of work in clean condition.
- G. Every effort has been made to verify that the information presented in the Contract Documents is complete and accurate; however, it shall be the Contractor's responsibility to verify all existing site conditions, information and dimensions.

3.03 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.04 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The work requires the disturbance, demolition, removal, and disposal of the following asbestos-containing materials (ACM) from the Bettye Davis East High School Academic Area Safety Improvements Project as shown on the drawings and as specified herein. Bulk samples have been taken of suspect materials in this facility and the results are documented in Section 02 26 00, Hazardous Materials Assessment:

1. Various colors and patterns of 9" x 9" and 12" x 12" vinyl asbestos tile and associated asbestos-containing black and tan (1960 only) flooring mastics (confirmed asbestos-containing in the 1960, 1972, and 1973 eras, assumed in the 1974 era).
2. Gypsum board systems (walls, ceilings, soffits, etc.) with asbestos-containing joint compound (confirmed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).
3. White and grey cementitious "sacking" materials on concrete (confirmed asbestos-containing in the 1972 and 1973 eras). NOTE: Finish material found to be ACM on concrete wall of Boys Bathroom in Music area (now removed) is believed to be patching with a joint compound. Twelve other samples of concrete sacking in the original construction did not contain asbestos.
4. Various colors (yellow, grey, tan, grey green) of ceiling grid "L" channel mastic of 2' x 2' and 2' x 4' suspended ceiling systems and on 12" x 12" concealed grid ceilings systems (confirmed asbestos-containing in the 1960, 1972, and 1974 eras). No ceiling grid "L" channel mastic has been observed in the 1973 era to date.
5. "Hard fitting" insulation on pipe fittings (fiberglass insulation on runs) of heating, domestic hot and cold-water piping, and roof drain piping (confirmed asbestos-containing in the 1960 and 1972 eras, not found to contain asbestos in the 1973 era, and not observed in the 1974 era).
6. Flange gaskets and valve packings on piping (confirmed asbestos-containing in the 1972 era, assumed asbestos-containing throughout all other eras).
7. Exterior window sealants, caulking, and glazing compounds (confirmed asbestos-containing in the 1972 and 1974 eras, not found to contain asbestos in the 1973 era, and assumed asbestos-containing in the 1960 era).
8. Various patterns of exterior wall texturing materials of entire school (confirmed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).
9. Remnant roofing materials (assumed asbestos-containing throughout all eras).
10. Roof patching tar (confirmed asbestos-containing in the 1973 era, assumed asbestos-containing throughout all other eras).
11. Remnant black tarry coating on original concrete roof deck and sidewalls (confirmed asbestos-containing in the 1972 era).

B. In addition to the above materials, the following materials are located in the project areas and other areas of the building, and may require disturbance for auxiliary support, such as electrical and mechanical equipment and installation of equipment. Not all ACM is to be removed from these areas, only that required to complete the project work need be removed:

1. Carpet mastic (confirmed asbestos-containing in the 1960, 1973, and 1974 eras).

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2
Section 02 82 33

2. Sheet vinyl (confirmed asbestos-containing in the 1960 era, assumed asbestos-containing in the 1972, 1973, and 1974 eras) with assumed asbestos-contaminated mastic.
3. Black rubber stair treads, risers, and stringers (confirmed asbestos-containing in the 1972 and 1973 eras).
4. Dark brown rubber flooring and associated dark tan mastic (confirmed asbestos-containing in the 1960 era, believed to have been removed by previous projects).
5. Brown mastic on rubber cove bases and stair stringers (confirmed asbestos-containing in the 1960 era).
6. Plaster (confirmed asbestos-containing in the 1960 era, believed to have been removed by previous projects).
7. Cement asbestos board finish materials (confirmed asbestos-containing, 1960, 1972, 1973, and 1974 eras).
8. Cement asbestos board insulated sandwich infill panels at exterior windows (confirmed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).
9. Cement asbestos board infill panels at interior windows and doors (assumed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).
10. Cement asbestos board on "roof break" (assumed asbestos-containing in the 1974 era).
11. Mastics for cement asbestos products (confirmed asbestos-containing in the 1972 era, assumed asbestos-containing or asbestos-contaminated in the 1960, 1973, and 1974 eras).
12. Mastics used to secure Styrofoam insulation (confirmed asbestos-containing in the 1972 and 1973 eras, assumed asbestos-containing in the 1960 and 1974 eras), and other types of insulation (assumed asbestos-containing in the 1960, 1972, 1973, and 1974 eras) to exterior concrete walls.
13. Mastics for chalk boards, marker boards, tack boards, bulletin boards (confirmed asbestos-containing in the 1960, assumed asbestos-containing in the 1972 and 1974 eras), and mirrors (assumed asbestos-containing in the 1960, 1972, and 1974 eras). None of these types of mastics have been observed in the 1973 era to date.
14. Red mastic for sound foam in the "TV Lab" (confirmed asbestos-containing in the 1973 era).
15. Black tarry dampproofing on interior face of exterior concrete walls (confirmed asbestos-containing in the 1974 era, assumed asbestos-containing in the 1960). Black tarry dampproofing materials on interior face of exterior concrete walls has not been observed in the 1972 or 1973 era to date.
16. Remnants of asbestos-containing fireproofing and overspray in the fan rooms of the Benson Building (confirmed asbestos-containing in the 1973 era).
17. "MAG" insulation on mechanical components (confirmed asbestos-containing in the 1960 era, mostly removed but may be in some concealed locations).
18. Insulation of abandoned heating and plumbing piping under 1960 era slab (assumed asbestos-containing in the 1960 era).
19. Duct pin mastic on insulated outside air intakes (confirmed asbestos-containing in the 1960 and 1973 eras, assumed asbestos-containing in the 1972 era and not observed in the 1974 era to date).
20. Duct pin mastics on ductwork sound linings (confirmed asbestos-containing in the 1960 era, assumed asbestos-containing in the 1972, 1973, and 1974 eras).
21. Duct seam sealants (confirmed asbestos-containing in the 1972 era, assumed asbestos-containing in the 1960, not found to contain asbestos in the 1973 era, and not observed in the 1974 era to date).
22. Black tarry coating on outside air ductwork (confirmed asbestos-containing in the 1960 era).

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2

Section 02 82 33

23. Sealants on air handling units (assumed asbestos-containing in the 1960, 1972, not found to contain asbestos in the 1973 era, and not observed in the 1974 era to date).
 24. Paper-like lining of abandoned under-slab fiberglass ductwork (confirmed asbestos-containing in the 1973 era).
 25. Black chemical resistant laboratory countertops, sinks, and backsplashes (assumed asbestos-containing in the 1960 era).
 26. White insulating cores of unlabeled wood doors (confirmed asbestos-containing in the 1960 era).
 27. Black tarry sound lining inside of clock/speaker box housings (confirmed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).
 28. Pink undercoating on the bottom of stainless-steel drinking fountains (confirmed asbestos-containing in the 1972 and 1973 eras), and various other colors of undercoatings of stainless-steel drinking fountains (assumed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).
 29. Black undercoating on the bottom of stainless-steel sinks (confirmed asbestos-containing in the 1960 and 1972 eras), and various other colors of undercoatings of stainless-steel sinks (assumed asbestos-containing in the 1960, 1972, 1973, and 1974 eras).
 30. White sealants around exterior doors (confirmed asbestos-containing in the 1960 era).
 31. Grey sealant on interior door frames (confirmed traces of asbestos in the 1960 era, assumed to contain greater than 1% asbestos if analyzed by TEM NOB).
 32. Black tarry sound lining inside of hollow metal door frames (confirmed asbestos-containing in the 1972 era).
 33. Penetration putties (confirmed asbestos-containing in the 1972 era, assumed asbestos-containing in the 1960, 1973, and 1974 eras).
 34. High temperature wiring insulation in older fluorescent light fixtures (confirmed asbestos-containing in the 1960 era).
 35. High temperature wiring insulation and heat shields in older incandescent light fixtures (assumed asbestos-containing in the 1960 era).
 36. High temperature wiring insulation in older high intensity discharge light fixtures (assumed asbestos-containing in the 1960 era).
 37. High temperature wiring insulation in older science room benchtop heating plates (assumed asbestos-containing in the 1960 era).
 38. Tarry dampproofing on foundation walls (assumed asbestos-containing throughout all eras).
 39. Welding aprons and gloves (confirmed asbestos-containing in the 1972 era, presumed to have been removed).
 40. Kiln materials (confirmed trace of asbestos, presumed to have been removed).
- C. Quantities of ACM and hazardous materials shown on drawings are based on a comprehensive survey of the building and take-offs from scale drawings. The Hazardous Material Assessment and quantities provided are considered a baseline for bid purposes. It is the contractor's responsibility to remove and dispose of all ACMs affected by the project from the site in accordance with applicable regulations. The contractor shall immediately notify the owner if other ACM or additional quantities are discovered. Quantities of materials removed shall be documented on a daily basis and shall include all materials removed and locations in the units used on the drawings. Unit pricing shall be provided in the bid for all identified hazardous material in case additional quantities are discovered.
- D. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead, are also present in settled

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2
Section 02 82 33

and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

- E. Notification of Child Occupied Facility: Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.
- F. Asbestos-containing materials may have come loose and fallen onto or into floors, ceilings, walls, chases, wall cavities or mechanical, electrical and structural system components. The Contractor shall immediately notify the Owner if and when they encounter worn, damaged, or deteriorated ACM as evidenced by dust or debris adjacent to ACM materials.
- G. Work may be required while faculty and students are occupying the building. Work during occupied periods involving disturbance of asbestos-containing materials inside the building shall be performed using critical barriers and negative air pressure enclosures. Access to work area from within the building shall be blocked to prevent unauthorized or inadvertent entry by students or faculty. Access to work area shall be secured by lock when work is not ongoing.
- H. All work shall comply with Environmental Protection Agency (EPA) AHERA standard, 40 CFR 763. Clearance sampling is required if the necessary disturbance of asbestos-containing material is not classified as "Small-Scale, Short-Duration" work as defined in 40 CFR 763 and is not required for work that only involves the disturbance of dusts with asbestos. Visual inspections are required for all work disturbing or removing asbestos. Clearance air samples shall include a minimum of five (5) Transmission Electron Microscopy (TEM) samples from each affected space, taken using aggressive methods as outlined in Appendix A to 40 CFR 763 and analyzed in accordance with 40 CFR 763.90. For portions of the building being demolished, five (5) aggressive PCM clearance samples are required if the building will be entered by non-abatement workers prior to demolition, if they will not be entered by unprotected workers, no clearance samples are required.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01 35 45 Airborne Contaminant Control
- B. Section 02 26 00 Hazardous Materials Assessment
- C. Section 02 83 33 Removal and Disposal of Materials Containing Lead
- D. Section 02 84 18 Removal and Disposal of Chemical Hazards

1.2 DEFINITIONS AND ABBREVIATIONS: Definitions and abbreviations are provided in the applicable publications listed in Paragraph 1.4 of this section.

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2
Section 02 82 33

- 1.3 APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced.
- A. General Requirements: All work shall be performed in compliance with the International Building, Fire, Fuel Gas, Mechanical, Residential, Energy Conservation and Administrative Code; Uniform Plumbing Code; the National Electrical Code; and the publications listed in this section that are in effect at the time of the bidding of this contract.
 - B. Title 29 Codes of Federal Regulations (CFR), Department of Labor (USDOL) Part 1910 General Occupational Safety and Health Standards Part 1926 Safety and Health Regulations for Construction
 - C. Title 40 CFR, Environmental Protection Agency (EPA)
 - Part 61 National Emission Standards for Hazardous Air Pollutants
 - Part 311 Worker Protection
 - Part 763 Asbestos
 - D. Title 49 CFR, Department of Transportation (DOT)
 - Part 171 General Information, Regulations and Definitions
 - Part 172 Hazardous Materials Communication and Regulations
 - Part 173 General Requirements for Shipments and Packaging
 - Part 177 Carriage by Public Highway
 - Part 178 Specifications for Packaging
 - Part 382 Requirements for Drug Testing
 - Part 383 Commercial Driver's License Standards
 - E. State of Alaska Administrative Codes (AAC)
 - 8 AAC 61 Occupational Safety and Health Standards
 - 18 AAC 60 Solid Waste Management
 - F. State of Alaska Statutes
 - AS 18.31 Health and Safety - Asbestos
 - AS 45.50.477 Titles Relating to Industrial Hygiene
 - G. Public Law 101-637
Asbestos School Hazard Abatement Reauthorization Act
 - H. Federal Standards
 - 313E Safety Data Sheets
 - I. American National Standard Institute (ANSI)
 - Z9.2 Local Exhaust Systems
 - Z87.1 Eye and Face Protection
 - Z88.2 Practices for Respiratory Protection
 - J. American Society for Testing and Materials (ASTM) D-4397 Polyethylene Sheeting
 - K. International Code Council
International Building (IBC), Fire, Fuel Gas, Mechanical, Residential, Energy Conservation and Administrative Codes Current Standards

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2
Section 02 82 33

- L. National Fire Protection Association (NFPA)
NFPA 701 Fire Tests for Flame Resistant Textiles and Films
- M. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Current Edition
- N. Underwriters Laboratories (UL)
UL 586 High-Efficiency, Particulate, Air (HEPA) Filter Units

1.4 QUALITY ASSURANCE

A. On-site Observation:

1. The safety and protection of the Contractor's employees, sub-contractor's employees, Owner's employees, the facility, and the public is the sole responsibility of the Contractor.
2. The Owner, the Owner's Representative or representatives of State or Federal agencies may make unannounced visits to the site during the work. The contractor shall make available two complete sets of clean, protective clothing for such visitor use. If the work requires the use of PAPR or Supplied Air Respirators, the contractor shall provide respirators to the visitor to ensure compatibility with fresh batteries or supplied air system. It is the visitor's responsibility to ensure medical qualification, training, and current "fit test" prior to using any respirator provided by the Contractor.
3. If the Owner or agency visitor determines that practices are in violation of applicable regulations, they will immediately notify the Contractor that operations must cease until corrective action is taken. Such notification will be followed by formal confirmation.
4. The Contractor shall stop work after receiving such notification. The work may not be restarted until the Contractor receives written authorization from the Owner.
5. All costs resulting from such a stop work order shall be borne by the Contractor and shall not be a basis for an increase in the contract amount or an extension of time.

B. Air Monitoring: Air monitoring during the work shall be performed as follows:

1. The Contractor shall hire Independent Testing Laboratories to collect and evaluate all air samples that are the responsibility of the Contractor. The Contractor shall direct its laboratories, in writing, to release air monitoring data, and all other pertinent data and records, to the Owner. A copy of this written direction shall be submitted to the Owner along with the information required by Paragraph 1.13 of this Specification.
2. The Contractor shall be responsible for monitoring its employees for potential exposure to airborne asbestos fibers as required by this specification and all applicable regulations.
3. The Contractor shall be responsible for work area monitoring and environmental monitoring outside the work area as required by this specification.
4. The Owner may perform air monitoring inside the building, inside the work areas, and on the Contractor's employees while asbestos work is underway and at any time during the work.
5. Final inspection and clearance air monitoring shall be conducted by the Contractor's Independent Testing Laboratory. The Independent Testing Laboratory may not be hired by the Abatement Subcontractor to perform final

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2
Section 02 82 33

- visual inspections and clearance air monitoring.
6. The Contractor shall have its Independent Testing Laboratories archive all air samples until the successful completion of the project.
- C. Additional Sampling of Suspect Materials:
1. The Contractor and all Subcontractors shall be vigilant during demolition and construction in the event additional suspect asbestos or hazardous materials are encountered. If suspect asbestos or hazardous materials not previously identified are encountered, the contractor shall stop work that may be affected by this material and immediately notify the Owner. The Owner or the Owner's Representative will provide recommendations and additional testing if necessary. All sampling by the Contractor shall be at their own cost.
 2. The Contractor and all Subcontractors shall notify the Owner prior to any bulk sampling of suspect asbestos-containing material or other hazardous materials to allow the Owner or Owner's Representative to be present during such sampling. All results of bulk sampling conducted by the Contractor or Subcontractors shall be submitted to the Owner.
- 1.5 PROTECTION OF EXISTING WORK TO REMAIN: Perform asbestos removal in the project work areas without contamination of adjacent work or the facility.
- 1.6 MEDICAL REQUIREMENTS
- A. Institute and maintain a medical surveillance program for employees in accordance with 29 CFR 1926.1101 and 29 CFR 1910.134.
 - B. Institute and maintain a random drug testing program, as required by 49 CFR 382, for all drivers of vehicles transporting asbestos or hazardous materials.
- 1.7 TRAINING: Employ only workers who are trained and certified as required by 8 AAC 61.600, 29 CFR 1910, 29 CFR 1926, 40 CFR 763, and 49 CFR 383 to remove, encapsulate, barricade, transport, or dispose of asbestos.
- 1.8 PERMITS AND NOTIFICATIONS: Secure necessary permits for asbestos removal, hauling, and disposal and provide timely notification as required by federal, state, and local authorities.
- 1.9 SAFETY AND ENVIRONMENTAL COMPLIANCE: Comply with laws, ordinances, rules, and regulations of federal, state, and local authorities regarding handling, storing, transporting, and disposing of hazardous materials and all other construction activities.
- 1.10 RESPIRATOR PROGRAM: Establish a respirator program as required by ANSI Z88.2 and 29 CFR 1910.134.
- 1.11 HAZARD COMMUNICATION PROGRAM: Implement a hazard communication program in accordance with 29 CFR 1910.1200.
- 1.12 SUBMITTALS
- A. The Contractor shall submit the following documentation to the Owner for review, approval or rejection. Work shall not begin until submittals are approved.
 1. Shop drawings.
 2. Work plan.
 3. Liability insurance policy and performance bond.
 4. Schedule.

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2
Section 02 82 33

5. Testing laboratory and laboratory personnel.
 6. Disposal site designations and disposal authorizations.
 7. Waste transporter designation.
 8. Notifications and certifications.
 9. "Competent Person" designation and experience.
 10. Request for substitutions.
- B. Shop drawings shall show:
1. Boundaries of each regulated work area.
 2. Location and construction of decontamination areas.
 3. Location of temporary site storage facilities.
 4. Location of air monitoring stations, both in and outside of the work area.
 5. Emergency egress route(s).
 6. Location of negative pressure exhaust systems, if required.
- C. The work plan shall include procedures for:
1. Work area setup and protection.
 2. Worker protection and decontamination.
 3. Initial exposure assessment procedures.
 4. Asbestos removal procedures.
 5. Waste load-out, transport, and disposal procedures.
 6. Air monitoring procedures.
 - a. Air monitoring procedures shall include the number of daily samples and the target volumes of each type of sample.
 - b. Clearance air monitoring procedures and protocols for each work area.
 7. Determination by the Certified Project Designer of the estimated quantities of ACM and PACM to be removed, and determination of clearance requirements for each different type or phase of work.
 8. Emergency procedures.
 9. The Work Plan shall be prepared, signed and dated by an Environmental Protection Agency (EPA) Certified Project Designer.
- D. Insurance Policy and Bond: Submit copies of the Contractor's or Subcontractor's insurance policy and performance bond. Submittal requirement is only to ensure that the insurance certificate(s) show specific coverage for the potentially hazardous materials being handled by this project. The insurance and bond amounts and certificate holder requirements are addressed in other portions of the contract documents and are not covered as part of this submittal requirement.
- E. Schedule: Submit construction schedule by work area.
- F. Independent Testing Laboratories and Laboratory Personnel: Submit the name, location, and phone number of proposed independent testing laboratories, and the names and certifications of the industrial hygiene technicians. Include the laboratory's accreditation. Not all laboratories will require all accreditations.
1. The Independent Testing Laboratories shall be acceptable to Owner.
 2. The laboratories shall be proficient in the National Institute of Occupational Safety and Health (NIOSH) Proficiency in Analytical Testing (PAT) program and shall be accredited by the National Institute of Science and Technology (NIST) under their National Voluntary Laboratory Accreditation Program (NVLAP) for bulk asbestos analysis and airborne asbestos fibers as appropriate. NVLAP accreditation for bulk asbestos analysis may be waived if the microscopists are

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2
Section 02 82 33

- listed in the American Industrial Hygiene Association (AIHA) Asbestos Analyst Registry (AAR).
3. Provide a current list of their microscopists who have participated in the latest PAT and NVLAP programs and provide the names of microscopists and evidence that they have completed the NIOSH 582 course or equivalent. Provide latest AAR report of performance for microscopists.
 4. Provide name(s) and resume(s) of proposed on-site industrial hygiene technician(s) showing academic degrees and Alaska Abatement Certificate(s). If On-Site analysis will be done, the microscopists shall be listed in the American Industrial Hygiene Association (AIHA) Asbestos Analyst Registry (AAR), or equivalent.
- G. Disposal Site: Submit the name and location of the proposed Alaska Department of Environmental Conservation/ U.S. Environmental Protection Agency (DEC/EPA) permitted disposal site. Submit authorization to dispose of asbestos waste by the proposed disposal site operator.
- H. Waste Transporter: Submit the name and address of the proposed waste transporter.
- I. Representations: Submit a signed statement by the Contractor that records of employees' work assignments, certifications, respirator fit tests, and medical records are accurate, up-to-date, and available for inspection.
- J. Notifications and Certificates:
1. Submit a copy of the written "Notification of Demolition and Renovation" to the Environmental Protection Agency. (If required by NESHAP).
 2. Submit a State of Alaska Department of Labor (ADOL) approved copy of the written ADOL notification of proposed workers.
 3. Submit a copy of Project Designer's current certification.
- K. Competent Person: Submit the name and certifications of the Contractor's proposed Competent Person and a list of their previous projects. Certify by signed statement that the Competent Person has the knowledge and training to supervise the work in compliance with the publications listed in Paragraph 1.4 above.
- L. Substitutions: Submit requests for substitutions of materials, equipment and methods.
- M. Updated Project Information: Submit changes to the submitted project information at least 24 hours prior to the effective time of change for the following:
1. Updated schedules.
 2. Change in Competent Person.
 3. ADOL approval for additional workers.
 4. Changes to work plan.
 5. Revisions to the EPA notification.
- 1.13 TEST REPORTS: Contractor shall submit periodic test reports, daily logs, monitoring results as specified herein Submit two (2) copies of the following information within twenty-four (24) hours after the end of a shift:
- A. Initial Exposure Assessment(s): Submit the results of the Contractor's initial exposure assessment(s).

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2
Section 02 82 33

- B. Daily Air Monitoring: Submit daily, all results of Contractor's air monitoring (submit no later than 24 hours after the end of the shift). Submittal shall consist of negative air pressure recordings, daily monitoring report, field data sheets, the analytical laboratory's results, and sketch of sample locations. Submit all results of any sampling of bulk materials to Owner within 24 hours of receipt of results. Bulk sample submittal shall consist of daily monitoring report, field data sheets, and the analytical laboratory's results, and sketch of sample locations, as well as the current certification of the asbestos Building Inspector who conducted the sampling.
 - C. Project Daily Logs: Submit the previous day's Daily Logs. Logs shall include regulated area sign-in sheets and list of asbestos-containing materials removed including quantities and locations of those materials, in the units used on the drawings. Claims for additional quantities will not be addressed unless daily quantities are submitted.
 - D. Clearance Air Monitoring: Submit draft results of Contractor's clearance air monitoring for each work area for Owner's review and approval prior to releasing the work area to unprotected workers. FAX or electronic submittals are acceptable. Submittal shall include the following:
 - 1. A signed and dated copy of the final visual inspection report (completed prior to clearance air monitoring) certifying that all dust and debris have been removed from the work area and that all ACM to be removed as required by the contract, were removed. Visual inspection reports are required for all removal, even if clearance air monitoring is not required.
 - 2. Documentation that clearance air sample collection complied with 40 CFR 763, contract specifications and the approved work plan.
 - 3. Drawings of the work area with sampling locations clearly marked. Work area drawings shall be clearly identified as to their location within the facility.
 - 4. Field data sheets for sampling including: sample locations, calibration device serial number, initial and final pump calibration readings, pump time on and off, initial and final sampling flow rate, pump type and serial number, and sample cassette identification.
 - 5. Laboratory results, signed and dated by the analyst.
 - 6. Data sheets and visual inspection sheets shall be signed and dated by the Industrial Hygiene Technician performing the work.
- 1.14 PROJECT COMPLIANCE DOCUMENTS: Prepare and submit the following records of compliance with hazardous materials regulations following each work area clearance. Submittals may contain segregated submittals for more than one (1) work area. Submittal shall be received by Owner within four (4) weeks following work area clearance. Compliance documents shall be signed and dated and shall include as a minimum:
- A. Waste transport records (40 CFR 61, Figure 4).
 - B. Disposal site receipts.
 - C. Contractor's "Start" and "Finish" dates for the work area(s).
 - D. Daily logs, including regulated area sign in sheets, materials summary, etc (if not previously submitted).
 - E. Final work area inspection report(s) and inspector certifications (if not previously submitted).
 - F. Final, signed, clean copies of all bulk and air sampling field data sheets, location drawings, negative air tapes and air monitoring log, including all clearance data.

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2
Section 02 82 33

- G. Final, signed, clear, legible copies of all analytical laboratory bulk and air monitoring test results, including all clearance data, and current laboratory certifications (if changed from previously submitted).
 - H. Copies of Asbestos Worker Training certificates for workers performing work on this project and all approved Alaska DOL notifications for those workers, and any revisions to the EPA notification(s).
- 1.15 SANITARY FACILITIES: Provide adequate toilet and hygiene facilities.
- 1.16 MATERIAL STORAGE: Store all materials subject to damage off the ground and secure from damage, weather, or vandalism.
- 1.17 ON-SITE DOCUMENTATION: The Contractor shall maintain on the job site, at a location approved by the owner, copies of the following data for safety procedures, equipment, and supplies used for the work
- A. Equipment: Show the model, style, capacity and the operation and maintenance procedures for the following, as applicable:
 - 1. High-Efficiency, Particulate, Air (HEPA) Filtration units.
 - 2. HEPA Vacuum cleaners.
 - 3. Pressure differential recording equipment.
 - 4. Heat stress monitoring equipment.
 - B. Safety Data Sheets (SDS): Maintain SDSs for each encapsulant, surfactant, solvent, detergent, and other material proposed to be used.
 - C. Respiratory Protection Plan: The Contractor's and/or Subcontractor's written respirator program.

PART 2 - PRODUCTS

- 2.1 PERSONAL PROTECTIVE EQUIPMENT: Provide personal protective clothing as approved and selected by the IH.
- A. Respirators: Provide personally issued and marked respirators approved by the National Institute of Occupational Safety and Health (NIOSH). Provide sufficient replacements for respirators with disposable canisters. Use respirators equipped with dual cartridges whenever both asbestos hazards and other respiratory hazards exist in the work area.
 - B. Provide filter cartridges approved for each airborne contaminant which may be present. NIOSH approved filter cartridges shall be used. At no time shall the permissible exposure limit (PEL) for the contaminant exceed the PEL listed in 8 AAC 61.1100.
 - C. Whole Body Protection: Provide approved disposable fire retardant, full body coveralls and hoods fabricated from nonwoven fabric, gloves, eye protection, and hard-hats, and other protective clothing as required to meet applicable safety regulations to personnel potentially exposed to asbestos above the permissible exposure limits (PELs). Wear this protection properly. Full facepiece respirators shall meet the requirements of ANSI Z87.1.
 - D. Provide protective personal equipment and clothing at no cost to the workers.

2.2 DECONTAMINATION UNIT

- A. Provide a temporary three-stage decontamination unit, attached in a leak-tight manner to each negative pressure work area. Decontamination units shall consist of a clean room equipped with separate lockers for each worker, a shower room, and an equipment locker room equipped with separate lockers for each worker.
- B. Shower specifications: Locate flow and temperature controls within the shower where adjustable by the user. Hot water service may be secured from the building hot water system if available, but only with back-flow protection installed by the Contractor at the point of connection, and with prior notification and approval by the Owner. Should sufficient hot water be unavailable, the Contractor shall provide a minimum 40-gallon electric hot water heater with a minimum recovery rate of 20 gallons per minute. Water from the shower room shall not be allowed to wet the floor in the clean room.

2.3 WASTEWATER FILTERS: Provide Water Filtration Units with filters of adequate capacity to treat decontamination water and shower flows. Water filtration unit effluent shall contain less than 7,000,000 asbestos fibers per liter prior to discharge to sanitary sewer or storm drains.

2.4 DANGER SIGNS AND TAPE: Post danger signs and tape signs to demarcate areas where asbestos waste is temporarily stored, and, in areas not accessible to the public, where asbestos- containing materials are left in place. Signs and labels shall be in accordance with applicable regulations and codes. The signs posted at work area entrances, exits, decontamination areas, emergency egress, and waste disposal areas shall comply with 29 CFR 1926.1101 and the International Fire Code.

2.5 WARNING LABELS: Affix warning labels to all components or containers containing asbestos waste. Conform labeling to 29 CFR 1926.1101 and 49 CFR 172.

2.6 HEPA FILTRATION UNITS: (if required) shall conform to ANSI Z9.2, and HEPA filters shall be UL-586 labeled.

2.7 PRESSURE DIFFERENTIAL MONITORING EQUIPMENT: Provide continuous monitoring of the pressure differential with an automatic recording instrument for each negative pressure enclosure. Locate the instrument in a clean area where personnel have access to it without respiratory protection. The instrument shall be fitted with an alarm should the negative pressure drop below -0.02 inches of water column relative to the air outside containment.

2.8 CHEMICALS

- A. Adhesives: Adhesives shall be capable of sealing joints of adjacent sheets of polyethylene to finished or unfinished surfaces and of adhering under both dry and wet conditions.
- B. Mastic Removal Solvents: Mastic removal solvents shall not contain halogenated compounds or compounds with flashpoints less than 60° C (140° F). Solvents shall be compatible with replacement materials.
- C. Sealants and Encapsulants: Penetrating and bridging encapsulants for asbestos applications. Tint "Lock-Down" encapsulants used in non-finished areas for identification in a color that will not obscure residual asbestos. Encapsulants shall be compatible with replacement materials.
- D. Surfactant: Use a surfactant specifically designed to effectively wet asbestos. Mix and apply the surfactant as recommended by the manufacturer.

2.9 SAFETY DATA SHEETS (SDSs): Provide SDSs for all chemical materials brought onto the work- site.

2.10 MATERIALS

- A. Disposal Containers: Use disposal containers to receive, retain, and dispose of asbestos- containing or contaminated materials. Label leak tight containers in accordance with the applicable regulations. Non-leak tight containers are not acceptable. Plastic bags shall be a minimum 6-mil polyethylene, pre-printed with approved warning labels. Plastic wrap shall be 6-mil polyethylene sheets, securely wrapped and taped. Disposal containers shall be labeled with "ASBESTOS NA 2212," Contractor's name and location, and a Class 9 label.
- B. Glove Bags: The glove bags shall be a minimum of 6-mil polyethylene or polyvinylchloride plastic, and specially designed for removal of asbestos-containing materials, with two inward projecting long sleeves and rubber gloves, one inward projecting water wand sleeve, an internal tool pouch, and an attached, labeled receptacle for asbestos waste.
- C. Plastic Sheet: A minimum 6-mil thick flame resistant polyethylene (in accordance with NFPA 701) shall be used unless otherwise specified.
- D. Tape: Tape shall be capable of sealing joints of adjacent sheets of polyethylene, for attachment of polyethylene sheets to finished or unfinished surfaces and of adhering under both dry and wet conditions.

2.11 OTHER MATERIALS: The Contractor shall provide standard commercial quality of all other materials as required to prepare and complete the work.

2.12 TOOLS AND EQUIPMENT

- A. The Contractor shall provide tools and equipment as required to prepare and complete the work. Tools and equipment shall meet all applicable safety regulations.
- B. Transportation equipment shall be suitable for loading, temporary storage, transit, and unloading of contaminated waste without exposure to persons or property. All trucks or vans used to transport asbestos shall be enclosed and all containers sealed leaktight. Truck drivers shall have a commercial driver's license with hazardous material endorsement.

PART 3 - EXECUTION

3.1 WORK AREAS

- A. Regulated Work Areas: Establish regulated work areas in compliance with 29 CFR 1926.1101.
- B. Decontamination Area: Install decontamination areas in compliance with 29 CFR 1926.1101. Decontamination area shall meet fire-exiting requirements of the International Fire Code. Showers shall be provided with hot water and water filtration units.
- C. Negative Pressure Enclosure System: Construct Negative Pressure Enclosure

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2
Section 02 82 33

Systems as required by 29 CFR 1926.1101, these specifications, and approved work plan. Signage shall conform to the International Fire Code and 29 CFR 1926.1101. Exhausts from HEPA Filtration Units shall terminate outside of the building.

- D. Notify applicable Fire Marshal as required by the International Fire Code.

3.2 PERSONNEL PROTECTION PROCEDURES

- A. Contractor's Competent Person shall strictly enforce personal protection procedures as required by the approved work plan and all applicable regulations.
- B. Post the decontamination, safety, and work procedures to be followed by workers.
- C. Provide continuous on-site supervision by the approved Competent Person.
- D. Maintain a daily log of all workers and visitors entering regulated work areas. Log shall contain the name of each individual, his or her organization, accurate time of entering and leaving, and purpose of visit.

3.3 ASBESTOS REMOVAL PROCEDURES: Remove asbestos in accordance with the Contractor's Approved Work Plan, applicable regulations and this specification. The Owner shall be notified 24 hours in advance of any asbestos disturbance taking place outside of a Negative Pressure Enclosure System.

3.4 AIR MONITORING

- A. Perform personal, work area, and environmental monitoring for airborne asbestos fibers by industrial hygiene technicians who are employees of (one of) the Contractor's Independent Testing Laboratories.
- B. Conduct air monitoring in accordance with 29 CFR 1926.1101, current EPA guidance, and as specified herein. Calibrate all sampling pumps on-site with a calibrated transfer standard before and after each sample. Built-in rotameters on pumps are not acceptable for calibration. Additional samples beyond the minimum numbers shown below may be necessary if samples are overloaded or require shorter sampling periods to achieve readable samples, due to size of the work force, or due to more than one 8-hour work shifts.
- C. Conduct daily work area and environmental air monitoring per shift as follows:
 - 1. Three (3) air samples within the work area.
 - 2. One (1) air sample located outside the entrance to the work area.
 - 3. One (1) air sample located at the exhaust(s) of the HEPA filtration unit(s) (if more than one unit is used, the sampling may be rotated between units, however, each unit must be sampled at least once every three days).
 - 4. Three (3) air samples located in adjacent occupied areas.
 - 5. Two (2) waste load-out samples for the full duration of the operation, one taken inside the wash-down station and one taken on the clean side of the wash-down station, in addition to the daily work area and environmental samples, (no samples are necessary if no load-out operation is performed).
- D. Clearance air monitoring shall be conducted by the Contractor's Independent Testing Laboratory subcontractor. The Independent Testing Laboratory may not be hired by the Abatement Subcontractor to perform visual inspections and clearance air monitoring. Owner approval is required before a work area is released to unprotected workers. The

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2
Section 02 82 33

Contractor is responsible for all costs associated with clearance and scheduling of visual inspection and clearance air monitoring. The maximum acceptable level of airborne asbestos fibers for work area clearance is as published in 40 CFR 763 for TEM analysis. A minimum of five aggressive clearance samples are required for each work area, regardless of the type of analysis. TEM analysis shall be used unless PCM analysis is approved. PCM analysis (NIOSH Method 7400) may be performed if allowed by 40 CFR 763 and with prior approval by the Owner or Owner's representative. The Contractor has the option, at its expense and at no cost to the Owner, of re-cleaning the work area and repeating the clearance air monitoring procedures or of having failed phase contrast microscopy (PCM) sample media sent to an approved NVLAP accredited laboratory for TEM analysis by NIOSH Method 7402.

- E. For small-scale, short-duration work, such as minor penetrations of gypsum wall board with asbestos-containing joint compound, gasket removal, or similar work, that work may be requested to be "cleared" on the basis of a minimum of 5 air samples taken inside the work area during the work, immediately adjacent to where removal is taking place, and where each of those air samples have fiber counts of less than 0.01 f/cc. If the samples taken during the work exceed 0.01 f/cc, the Contractor has the option, at its expense and at no cost to the Owner, of having failed PCM samples sent to an approved NVLAP accredited laboratory for TEM analysis by NIOSH Method 7402, or of re-cleaning the work area and conducting aggressive clearance PCM air monitoring procedures. These alternative "clearance" sampling protocols will only be allowed if fully outlined in the contractor's work plan, with specific pre-approval by the Owner. Visual inspections are required for all removal work, including small-scale, short-duration work.
- F. Conduct personal air monitoring in accordance with 29 CFR 1926.1101 and as specified herein.
1. Take personnel samples (excluding excursion samples) at least twice per eight-hour work shift at the rate of one sample for every six people performing that task in the same work area. Persons performing separate tasks or in separate work areas shall be sampled separately.
 2. Collect and analyze excursion samples as required by 29 CFR 1926.1101.
 3. Continuously monitor all workers disturbing asbestos outside of a Negative-Pressure Enclosure System if that work is conducted indoors.
- G. Daily personnel monitoring may be discontinued only after the Contractor's Independent Testing Laboratory certifies in writing that a Negative Exposure Assessment has been obtained and the Owner has reviewed and approved the negative exposure assessment data.
- H. Submit air monitoring results to the Owner as specified in Paragraphs 1.14 and 1.15.

3.5 DISPOSAL

- A. Dispose of asbestos wastes in an EPA/DEC permitted asbestos landfill.
- B. Comply with current waste disposal, handling, labeling, storage, and transportation requirements of the waste disposal facility, U.S. Department of Transportation, and EPA regulations.
- C. Workers handling waste shall wear protective clothing and canister type respirators.
- D. Drivers of the waste transport vehicles need not wear respirators while enroute.

- E. Workers shall wear respirators when handling asbestos material at the disposal site.

3.6 CLEANING OF WORK AREA

- A. Remove all asbestos material and debris upon completion of asbestos repair or removal within a work area. Wet clean or HEPA vacuum all surfaces within the work area.
- B. Notify the Owner and the Independent Testing Laboratory that asbestos work has been completed and the work area is ready for visual inspection. Visual inspections are required even if clearance air monitoring is not required. Include in the visual inspection report a statement that all asbestos in the work area has been removed, repaired and/or encapsulated as required by the contract, and that all debris has been removed.
- C. All required demolition (ACM and non-ACM) shall be completed in each work area prior to clearance air monitoring. Exceptions may be made with prior approval of the Owner.
- D. A lockdown encapsulant shall be applied to all surfaces within the abatement areas prior to performing clearance air monitoring.

3.7 CLEARANCE AIR MONITORING

- A. The Contractor and its Independent Testing Laboratory shall conduct and document a visual inspection to verify that all asbestos in the work area has been removed, repaired and/or encapsulated as required by the contract, and that all debris has been removed.
- B. Final clearance air monitoring tests shall not be performed until all areas and materials within the work area are fully clean and dry.
- C. Final clearance air monitoring shall be conducted by the Contractor's Independent Testing Laboratory in accordance with all applicable regulations and the Contractor's approved work plan after passing the visual inspection. The clearance criteria shall include a minimum of five clearance samples using "aggressive methods" collected and analyzed in accordance with 40 CFR 763. TEM analysis is required, unless PCM analysis is specifically pre-approved by the Owner as part of the work plan submittal.
- D. If the final clearance air monitoring results show that the work area has failed to meet the clearance criteria, the Independent Testing Laboratory shall notify the Owner and the Contractor. The Contractor shall reclean the work area and request the Independent Testing Laboratory to conduct a follow-up inspection to be followed by another set of clearance air monitoring samples. All work specified in this paragraph shall be done at no additional expense to the Owner.
- E. If the clearance air monitoring results meet the clearance criteria of 40 CFR 763 and the specifications for the work and the Owner has reviewed and accepted the clearance results as required by 1.14 D, then the HEPA filtration units may be deactivated (if applicable) and all seals, barriers, barricades, and decontamination areas shall be dismantled and removed, and the work area released to unprotected workers.
- F. Submit the final work area inspection report, clearance air monitoring field data sheets and the laboratory air monitoring report to the Owner as specified in Paragraph 1.15.

3.8 SUBSTANTIAL COMPLETION

- A. After the work area barriers and temporary construction and equipment have been

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

Division 2
Section 02 82 33

removed, the Contractor shall inspect the work area to verify that no asbestos debris, contaminated water, or other residue remains. Any remaining residue shall be cleaned up using HEPA vacuum cleaners and wet wiping methods.

- B. The Contractor shall certify that the work area has been cleaned of all asbestos in compliance with the contract, and that there is no unrepaired damage to walls, ceilings, doors, surfaces, equipment or finishes other than that called for by the scope of work.
- C. Costs of restoration of damaged finishes shall be borne by the Contractor.

END OF SECTION

REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The work may require the disturbance (including cleanup of existing loose paint), demolition, or removal, and disposal of lead painted and/or lead-containing materials related to the Bettye Davis East High School Academic Area Safety Improvements Project as shown on the drawings and as specified herein. Items to be disturbed may include, but are not limited to:
1. Painted interior and exterior surfaces, including, but not limited to painted windows, doors and frames, painted mechanical and electrical equipment, painted structural and miscellaneous steel, etc.
 2. Metallic lead flashings at VTR's, roof drain bowl clamping rings, and other roof penetrations, etc.
 3. Metallic lead caulking in bell and spigot pipe joints.
 4. Metallic lead in pipe solder at copper pipe fittings.
 5. Lead-containing dust in and on architectural, structural, mechanical, and electrical components.
 6. Lead-acid batteries for exit and emergency lights, and other equipment.
- B. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead, are also present in settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.
- C. Notification of Child Occupied Facility: Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements. It is anticipated that only small amounts of lead-based paint will be required to be disturbed for this renovation work, and the work would be classified as *minor repair and maintenance activities*, therefore most requirements of 40 CFR 745 do not apply.
- D. Portions of this building were constructed prior to 1978 and representative components affected by this project have been tested for lead-based paint. The building is not classified as a child occupied facility and therefore most requirements of 40 CFR 745 do not apply.
- E. The work includes all air monitoring, dust sampling, waste testing and disposal as specified herein. Materials listed are not necessarily hazardous waste or hazardous to handle. Lead-containing paints or materials identified for demolition and disposal shall

REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

Division 2
Section 02 83 33

be tested by the Toxicity Characteristics Leaching Procedure (TCLP) to determine if they are hazardous waste prior to disposal. Metal waste shall be recycled where practical.

- F. All work disturbing lead-containing materials shall comply with 29 CFR 1926.62, and other applicable regulations. OSHA regulations apply equally to lead-containing materials, lead-containing paints, and lead-based paints, and are referred herein as lead-containing materials. IMPORTANT: All renovation work (other than *minor repair and maintenance activities*) performed on or after April 22, 2010 in *Child Occupied Facilities* (see definitions in 40 CFR 745) where lead-based paint will be disturbed must be performed by an EPA certified *Firm* (Contractor) and directed by an EPA certified *Renovator* using certified and/or properly trained individuals (*Workers*). In addition to the training certifications, the *Firm* must provide the Owner with the EPA pamphlet "*Renovate Right: Important Lead Hazard Information for Families, Childcare Providers and Schools*," obtain a written acknowledgement of the pamphlet receipt, comply with EPA work practice standards and maintain records in accordance with 40 CFR 745.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01 35 45 Airborne Contaminant Control
- B. Section 02 26 00 Hazardous Materials Assessment
- C. Section 02 82 33 Removal and Disposal of Asbestos Containing Materials
- D. Section 02 84 18 Removal and Disposal of Chemical Hazards

1.2 DEFINITIONS AND ABBREVIATIONS: Definitions and abbreviations are provided in the applicable publications listed in Paragraph 1.4 of this section.

1.3 APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced.

- A. General Requirements: All work shall be performed in compliance with the International Building (IBC), Fire, Fuel Gas, Mechanical, Residential, Energy Conservation and Administrative Code; Uniform Plumbing Code; the National Electrical Code; and the publications listed in this section that are in effect at the time of the bidding of this contract.
- B. Title 29 Code of Federal Regulations (CFR), Department of Labor (USDOL)
 - Part 1910 General Occupational Safety and Health
 - Standards Part 1926 Safety and Health Regulations for Construction
- C. Title 40 CFR, Environmental Protection Agency (EPA)
 - Part 260 Hazardous Waste Management System: General
 - Part 261 Identification and Listing of Hazardous Wastes
 - Part 262 Standards Applicable to Generators of Hazardous
 - Waste Part 263 Standards Applicable to Transporters of Hazardous
 - Waste Part 270 Hazardous Waste Permit Program
 - Part 273 Standards for Universal Waste Management
 - Part 311 Worker Protection
 - Part 745 Lead Based Paint Poisoning Prevention in Certain Residential Structures
- D. Title 49 CFR, Department of Transportation (DOT)

REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

Division 2
Section 02 83 33

- Part 171 General Information, Regulations and Definitions
- Part 172 Hazardous Materials Communication and Regulations
- Part 173 General Requirements for Shipments and Packaging
- Part 176 Carriage by Vessel
- Part 177 Carriage by Public Highway
- Part 178 Specifications for Packaging
- Part 382 Requirements for Drug Testing
- Part 383 Commercial Driver's License Standards

- E. Alaska Administrative Codes (AAC)
 - 8 AAC 61 Occupational Safety and Health Standards
 - 18 AAC 60 Solid Waste Management
 - 18 AAC 62 Hazardous Waste Management
 - 18 AAC 70 Water Quality Standards
 - 18 AAC 75 Oil and Hazardous Substances Pollution Control

- F. Alaska Statues (AS)
 - AS 45.50.477 Titles Relating to Industrial Hygiene

- G. Municipality of Anchorage
 - AMC 26.50.060 Specific Discharge Limitations

- H. Federal Standards
 - 313E Safety Data Sheets

- I. American National Standards Institute
 - (ANSI) Z9.2 Local Exhaust Systems
 - Z87.1 Eye and Face Protection
 - Z88.2 Practices for Respiratory Protection

- J. American Society for Testing and Materials
 - (ASTM) D 4397 Polyethylene Sheeting
 - E 1728 Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Lead Determination
 - E 1792 Specification for Wipe Sampling Materials for Lead in Surface Dust

- K. International Code Council
 - International Building (IBC), Fire, Fuel Gas, Mechanical, Residential, Energy Conservation and Administrative Code Current Standards

- L. National Fire Protection Association (NFPA)
 - NFPA 701 Fire Tests for Flame Resistant Textiles and Films

- M. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Current Edition

- N. Underwriters Laboratories (UL)
 - UL 586 High-Efficiency, Particulate, Air (HEPA) Filter Units

- 1.4 QUALITY ASSURANCE
 - A. On-site Observation:

REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

Division 2

Section 02 83 33

1. The safety and protection of the Contractor's employees, Subcontractor's employees, Owner's employees, the facility, and the public is the sole responsibility of the Contractor.
 2. The Owner, the Owner's Representative, or representatives of State or Federal agencies may make unannounced visits to the site during the work. The Contractor shall make available two complete sets of clean, protective clothing for such visitor use. If the work requires the use of PAPR or Supplied Air Respirators, the contractor shall provide respirators to the visitor to ensure compatibility with fresh batteries or supplied air system. It is the visitor's responsibility to ensure medical qualification, training, and current "fit test" prior to using any respirator provided by the Contractor.
 3. If the Owner or agency visitor determines that practices are in violation of applicable regulations, they will immediately notify the Contractor that operations must cease until corrective action is taken. Such notification will be followed by formal confirmation.
 4. The Contractor shall stop work after receiving such notification. The work may not be restarted until the Contractor receives written authorization from the Owner.
 5. All costs resulting from such a stop work order shall be borne by the Contractor and shall not be a basis for an increase in the contract amount or an extension of time.
- B. Monitoring and Testing: Monitoring and testing during the work shall be performed as follows:
1. The Contractor shall hire Independent Testing Laboratories to collect and evaluate all air, dust, bulk, and toxicity characteristic leaching procedure (TCLP) samples that are the responsibility of the Contractor. The Contractor shall direct its laboratories, in writing, to release monitoring and testing data, and all other pertinent data and records, to the Owner.
 2. The Contractor shall be responsible for monitoring its employees for potential exposure to airborne contaminants as required by this specification and all applicable regulations.
 3. The Contractor shall be responsible for work area monitoring and environmental monitoring outside the work area as required by this specification.
 4. The Owner may perform monitoring and testing inside the building, inside the work areas, and on the Contractor's employees while work is underway and at any time during the work.
 5. Final inspection and clearance testing shall be conducted by the Contractor.
 6. The Contractor shall have its Independent Testing Laboratories archive all samples until the successful completion of the project.
- C. Additional Sampling of Suspect Materials:
1. The Contractor and all Subcontractors shall be vigilant during demolition and construction in the event additional suspect lead or hazardous materials are encountered. If suspect lead or hazardous materials not previously identified are encountered, the contractor shall stop work that may be affected by this material and immediately notify the Owner. The Owner or the Owner's Representative will provide recommendations and additional testing if necessary. All sampling by the Contractor shall be at their own cost.

REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

Division 2

Section 02 83 33

2. The Contractor and all Subcontractors shall notify the Owner prior to any bulk sampling of suspect lead-containing material or other hazardous materials to allow the Owner or Owner's Representative to be present during such sampling.
- 1.5 PROTECTION OF EXISTING WORK TO REMAIN: Perform lead removal in the project work areas without damage or contamination of adjacent work or the facility.
- 1.6 MEDICAL REQUIREMENTS
 - A. Institute and maintain a surveillance program in accordance with 29 CFR 1926.62 and 29 CFR 1910.134.
 - B. Institute and maintain a random drug testing program, as required by 49 CFR 382, for all drivers of vehicles transporting hazardous materials.
- 1.7 TRAINING: Employ only workers who are trained and certified as required by 29 CFR 1910, 29 CFR 1926, 40 CFR 311, 40 CFR 745 and 49 CFR 383 to remove, encapsulate, barricade, transport, or dispose of lead-containing materials.
- 1.8 PERMITS, IDENTIFICATION NUMBERS AND NOTIFICATIONS: Secure necessary permits for hazardous material removal, storage, transport and disposal and provide timely notification as required by federal, state, and local authorities.
- 1.9 SAFETY AND ENVIRONMENTAL COMPLIANCE: Comply with laws, ordinances, rules, and regulations of federal, state, and local authorities regarding handling, storing, transporting, and disposing of hazardous materials and all other construction activities.
- 1.10 RESPIRATOR PROGRAM: Establish a respirator program as required by ANSI Z88.2 and 29 CFR 1910.134.
- 1.11 HAZARD COMMUNICATION PROGRAM: Implement a hazard communication program in accordance with 29 CFR 1910.1200.
- 1.12 SUBMITTALS
 - A. Submit the following documentation to the Owner for review, approval or rejection. Work shall not begin until submittals are approved.
 1. Shop drawings.
 2. Work plan.
 3. Liability insurance policy and performance bond.
 4. Schedule.
 5. Independent testing laboratory and laboratory personnel.
 6. Disposal site designations.
 7. Waste transporter designations.
 8. Representations.
 9. "Competent Person" designation and experience.
 10. EPA Training certifications and notification plan, if required.
 11. Request for substitutions.
 - B. Shop drawings shall show:
 1. Boundaries of each lead work area, if required.
 2. Location and construction of decontamination stations, if required.

REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

Division 2

Section 02 83 33

3. Location of temporary site storage facilities.
 4. Location of air monitoring stations, both in and outside of the work area.
 5. Emergency egress route(s).
 6. Location of negative pressure exhaust systems, if required.
- C. The work plan shall include procedures for:
1. Work area set-up and protection.
 2. Worker protection and decontamination.
 3. Initial exposure determination(s).
 4. Lead removal procedures.
 5. Waste testing, transport, and disposal procedures.
 6. Monitoring and testing procedures (Sampling and Analysis Plan).
 7. Spill clean-up emergency procedures.
 8. Method of owner/occupant notification as per 40 CFR 745, if required.
- D. Insurance Policy and Bond: Submit copies of the Contractor's or Subcontractor's insurance policy and performance bond. Submittal requirement is only to ensure that the insurance certificate(s) show specific coverage for the potentially hazardous materials being handled by this project. The insurance and bond amounts and certificate holder requirements are addressed in other portions of the contract documents and are not covered as part of this submittal requirement.
- E. Schedule: Submit construction schedule by work area.
- F. Independent Testing Laboratories and Laboratory Personnel: Submit the name, location, and phone number of proposed independent testing laboratories, and the names and certifications of the industrial hygiene technicians. Include the laboratory's accreditation. Not all laboratories will require all accreditations.
1. The Independent Testing Laboratories shall be acceptable to Owner.
 2. Submit evidence that the laboratory is currently judged proficient in lead analysis, as determined by the Environmental Lead Proficiency Analytical Testing (ELPAT) Program, of the American Industrial Hygiene Association (AIHA) Environmental Lead Laboratory Accreditation Program (ELLAP) for lead in paint chip, soil, and dust wipe samples.
 3. Submit evidence that the laboratory is currently certified by OSHA to perform blood lead analysis.
 4. Submit evidence that the laboratory has demonstrated proficiency as determined by ELPAT or ELLAP performance for NIOSH Method 7082 and/or NIOSH Method 7105 analytical method for the determination of lead in air.
 5. Submit evidence that the laboratory has demonstrated proficiency in performing analyses according to Method 1311 TCLP, corresponding to the current version of Test Methods for Evaluating Solid Wastes (Chemical Physical Methods), SW- 846. Evidence may include successful participation in a recognized inter- laboratory quality control program such as a laboratory certified by the California Health and Welfare Agency, Department of Health Services, or a more informal inter-laboratory quality control program.
 6. Submit evidence that the laboratory is currently accredited by the American Industrial Hygiene Association (AIHA).
 7. Submit the name, address, telephone number, and résumé of the Contractor's Industrial Hygienist (IH) who prepared the Sampling and Analysis Plan and will oversee the on-site monitoring, visual inspections and clearance testing. Submit the names, addresses, and résumés of industrial hygiene technicians who may assist the IH for on-site tasks. Submit documentation that the IH has

REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

Division 2
Section 02 83 33

- all the qualifications for the assigned duties as required by the Contractor's liability insurance policy.
8. Submit copies of the Contractor's letter to each of the independent testing laboratories, directing each to release all the results for this project to the Owner, as these results become available and as specified herein.
- G. Disposal Site: Submit the name and location of the proposed Environmental Protection Agency (EPA) permitted disposal site.
- H. Waste Transporter: Submit the name and address of the proposed waste transporter.
- I. Representations: Submit statement by the Contractor that records of employees' work assignments, certifications, respirator fit tests, and medical records are accurate, up-to-date, and available for inspection.
- J. Competent Person: Submit the name and certifications of the Contractor's proposed Competent Person and a list of their previous projects. Certify that the Competent Person has the knowledge and training to supervise the work in compliance with the publications listed in Paragraph 1.4 above.
- K. EPA Lead Training Certifications, and Notification Plan: On projects where lead-based paint is to be disturbed for other than minor repair and maintenance activities in child-occupied facilities, submit Firm and Renovator certificates of training, and describe the contractor's plan to notify the owner and parents and guardians of the planned activities in accordance with 40 CFR 745.
- L. Substitutions: Submit requests for substitutions of materials, equipment and methods.
- M. Updated Project Information: Submit changes to the submitted project information at least 24 hours prior to the effective time of change for the following:
1. Updated schedules for lead removal.
 2. Change in Competent Person.
 3. Changes to work plan.
- 1.13 TEST REPORTS: Submit the following documentation produced during the work as soon as received:
- A. Project Daily Logs: Submit the previous day's Daily Logs. Logs shall include regulated area sign-in sheets and list of lead-containing materials removed, including quantities and locations of those materials, in the units used on the drawings. Claims for additional quantities will not be addressed unless daily quantities are submitted.
- B. Daily Monitoring: Submit daily, all results of Contractor's air, and dust monitoring (submit no later than 24 hours after the end of the shift). Submittal shall consist of daily monitoring report, field data sheets, the analytical laboratory's results, and sketch of sample locations. Submit all results of any TCLP sampling or testing of bulk materials to Owner within 24 hours of receipt of results. Bulk or TCLP sample submittal shall consist of daily monitoring report, field data sheets, the analytical laboratory's results, and sketch of sample locations (sketch not required for TCLP samples, but descriptions of materials included is required).
- 1.14 PROJECT COMPLIANCE DOCUMENTS: Submit the following documents to the Owner with application for final payment:
- A. Contractor's actual project "Start and Finish" dates.

REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

Division 2
Section 02 83 33

- B. Waste testing results per Paragraph 3.5 (A).
 - C. Waste Shipment Records (Manifest EPA form 8700-22) if required.
 - D. Clearance sampling and soil sampling data sheets (if required) and laboratory reports.
 - E. Disposal site receipts, or certification of acceptance for recycling.
 - F. Final clearance submittals as outlined in 3.7 (if required).
 - G. Evidence that each employee who was engaged in lead disturbance/removal work or who was exposed to lead completed training on lead covering the requirements of 29 CFR 1926.62 and evidence that the certified renovator, cleaning verification and recordkeeping and reporting requirements of 40 CFR 745 have been met, if required.
 - H. Evidence of owner acknowledgement of receipt of EPA pamphlet "Renovate Right: Important Lead Hazard Information for Families, Childcare Providers and Schools", if required.
- 1.15 SANITARY FACILITIES: Provide adequate toilet and hygiene facilities.
- 1.16 MATERIAL STORAGE: Store all materials subject to damage off the ground and secure from damage, weather, or vandalism.
- 1.17 ON-SITE DOCUMENTATION: The Contractor shall maintain on the job site, at a location approved by the owner, copies of the following data for safety procedures, equipment, and supplies used for the work
- A. Equipment: Show the model, style, capacity and the operation and maintenance procedures for the following, as applicable:
 - 1. High-Efficiency, Particulate, Air (HEPA) Filtration units.
 - 2. HEPA Vacuum cleaners.
 - 3. Pressure differential recording equipment.
 - 4. Heat stress monitoring equipment.
 - B. Safety Data Sheets (SDSs): Maintain SDSs for each encapsulant, surfactant, solvent, detergent, and other material proposed to be used.
 - C. Respiratory Protection Plan: The Contractor's written respirator program.

PART 2 - PRODUCTS

- 2.1 PERSONAL PROTECTIVE EQUIPMENT: Provide personal protective clothing as approved and selected by the IH.
- A. Respirators: Provide personally issued and marked respirators approved by the National Institute of Occupational Safety and Health (NIOSH). Provide sufficient replacements for respirators with disposable canisters. Use respirators equipped with dual cartridges whenever both lead hazards and other respiratory hazards exist in the work area.
 - B. Provide filter cartridges approved for each airborne contaminant which may be present. NIOSH approved filter cartridges shall be used. At no time shall the

REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

Division 2
Section 02 83 33

permissible exposure limit (PEL) for the contaminant exceed the PEL listed in 8 AAC 61.1100.

- C. Whole Body Protection: Provide approved aprons, gloves, eye protection, and hard-hats, and other protective clothing as required to meet applicable safety regulations to personnel potentially exposed to lead dust or fumes above the permissible exposure limit (PEL). Wear this protection properly. Full facepiece respirators shall meet the requirements of ANSI Z87.1.
- D. Provide protective personal equipment and clothing at no cost to the workers.

2.2 DECONTAMINATION UNIT

- A. Provide a temporary three-stage decontamination unit, attached in a leak-tight manner to each Contained Work Area. Decontamination units shall consist of a clean room equipped with separate lockers for each worker, a shower room, and an equipment locker room equipped with separate lockers for each worker.
- B. Shower specifications: Locate flow and temperature controls within the shower and be adjustable by the user. Hot water service may be secured from the building hot water system if available, but only with back-flow protection installed by the Contractor at the point of connection, and with prior notification and approval by the Owner. Should sufficient hot water be unavailable, the Contractor shall provide a minimum 40-gallon electric hot water heater with a minimum recovery rate of 20 gallons per hour. Water from the shower room shall not be allowed to wet the floor in the clean room.

2.3 WASTEWATER FILTERS: Install the wastewater filters in a series of stages with the final filtration stage sufficient to meet discharge standard of 18 AAC 70 and/or any local sewage system discharge limit for lead. Size the wastewater pump for 1.25 times the shower head flow- rate. Dispose all filters as lead contaminated waste.

2.4 WARNING SIGNS AND TAPE: Post warning signs and tape at the boundaries and entrances to lead disturbance and removal work areas. Signs required by other statutes, regulations, or ordinances may be posted in addition to, or in combination with, this warning sign. Conform warning signs and tape to the requirements of 29 CFR 1926.62.

2.5 WARNING LABELS: Affix warning labels to all hazardous waste disposal containers as described in the Contractor's approved Solid Waste Disposal Plan. Conform labeling to 29 CFR 1926.62 and 49 CFR 100-199.

2.6 NEGATIVE PRESSURE EXHAUST SYSTEM: Use the negative pressure exhaust systems to exhaust each contained work area where the PEL will or is expected to be exceeded. Operate the negative pressure exhaust system continuously (24 hours a day) during lead work. Select the negative pressure exhaust system equipment to provide a minimum of 4 air changes per hour under load within the work area. The negative pressure exhaust system shall have a minimum of two stages of pre-filtration ahead of the HEPA filter: The HEPA filter shall bear the UL-586 label. In no case shall the building ventilation system be used as the local exhaust for the contained work area. Terminate the exhaust outside of the building. The exhaust ventilation system equipment shall be equipped with lock-out protection to prevent operation without a HEPA filter properly installed. The exhaust system equipment shall be equipped with the following instrumentation: a static pressure gauge with low flow alarm, an elapsed time indicator, automatic shutdown capability in the event of a major rupture in the HEPA filter or blocked air discharge and an automatic re-start when power is restored after a power failure.

2.7 PRESSURE DIFFERENTIAL MONITORING EQUIPMENT: Provide continuous monitoring of

REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

Division 2

Section 02 83 33

the pressure differential with an automatic recording instrument for each contained work area. Locate the instrument in a clean area where personnel have access to it without respiratory protection. The instrument shall be fitted with an alarm should the negative pressure drop below -0.02 inches of water column relative to the air outside containment.

- 2.8 TOOLS: Vacuum cleaners shall be equipped with HEPA filters. Use only approved power tools to remove lead-containing material. Do not use open-flame and electric element heat-gun type tools with temperatures in excess of 700° F to remove lead-containing material. Remove all residual lead contamination from reusable tools being removed from lead disturbance or removal work areas. Electrical tools and equipment shall be UL listed.
- 2.9 AIR MONITORING EQUIPMENT: The Contractor's IH shall select the air monitoring equipment to be used for the evaluation of airborne lead.
- 2.10 EXPENDABLE SUPPLIES: Provide flame resistant 6-mil thick polyethylene sheet plastic in widths necessary to minimize seams.
- 2.11 SAFETY DATA SHEETS (SDSs): Provide SDSs for all chemical materials brought onto the work-site.
- 2.12 OTHER ITEMS: Provide other items, such as consumable materials, disposable and/or reusable cleaning equipment and hand tools, or miscellaneous construction equipment and materials, in sufficient quantity as necessary to fulfill and complete the requirements of the contract. Electrical equipment and supplies shall be UL listed.
- 2.13 ENCAPSULANTS: Encapsulants shall contain no toxic or hazardous substances. Encapsulants shall be compatible with the products to which they are applied and be compatible with replacement products.

PART 3 - EXECUTION

3.1 WORK AREAS

- A. Lead Control Areas: A control area, structure or containment where lead-containing or contaminated materials are being disturbed. Critical barriers and/or physical boundaries shall be employed to isolate the lead control area and to prevent migration of lead contamination and unauthorized entry of personnel. Refer to 40 CFR 745 for additional requirements if lead-based paint is disturbed in child-occupied facilities.
- B. Contained Lead Work Area Requirements: Construct contained lead work areas as described in the Contractor's approved work plan. A contained lead work area is required whenever airborne lead levels cannot be maintained below the OSHA action level at the boundary of a lead work area.
- C. Building Ventilation System: Shut down and isolate by air-tight seals all building ventilation systems supplying air into or returning air from a lead control area or contained lead work area.
- D. Building Electrical Systems: Verify that the electrical service is deactivated, disconnected and locked out where necessary for wet washing and/or removal. Provide temporary electrical service, equipped with ground fault protection, where needed.

3.2 PERSONNEL PROTECTION PROCEDURES

- A. Initial Determination: An initial determination is required in the absence of acceptable prior exposure data in accordance with 29 CFR 1926.62. Establish an initial lead work area for each material to be disturbed and each disturbance procedure if required. Isolate these lead work areas from the rest of the building. Personnel working in these areas shall wear respiratory protection and personal protective equipment as directed by the IH. Perform personal and work area air monitoring as directed by the IH. Operational decontamination facilities shall be available. Work performed shall be representative of the work to be done during the remainder of the project.
- B. Respirator Evaluation: Upgrading, downgrading, or not requiring respirators shall be recommended by the Contractor's IH based on the measured airborne lead-containing dust or fume concentrations. Immediately implement recommendations to upgrade the respiratory protection, followed by notification to the Owner. NOTE: Submit recommendations in writing to downgrade respirator type or not require respirators to the Owner for review and written approval prior to implementation.
- C. Decontamination Procedures: Worker and material decontamination procedures shall be as described in the Contractor's approved work plan. Worker decontamination shall be as directed by the Contractor's competent person.
- D. Work Stoppage: Stop work if the IH, the Owner, or a representative of a regulatory agency determines that the work is not in compliance with the Contractor's approved work plan, these specifications, or applicable laws and regulations. The Contractor shall stop work and notify the Owner whenever the measured concentrations of lead outside the lead control area equal or exceed $30 \mu\text{g}/\text{m}^3$ for airborne lead or $200 \mu\text{g}/\text{ft}^2$ for lead dust on surfaces that would normally be accessible by building occupants. When such work stoppage occurs, the cause of the contamination shall be corrected and the damaged or contaminated area shall be restored to its original decontaminated condition by the Contractor at no expense to the Owner. The Contractor is responsible for removing dusts and debris that were generated as a result of his work.
- E. The Contractor shall adhere to all applicable regulations regarding entry into confined spaces.

3.3 LEAD DISTURBANCE AND REMOVAL PROCEDURES:

- A. General: Perform lead disturbance or removal work in accordance with the Contractor's approved work plan, applicable regulations and this specification.
- B. Pre-Cleaning: Removal of existing loose paint chips is included in the scope of work. Pre-clean surfaces by HEPA vacuum and wet washing/wiping prior to the establishment of a work area.
- C. For renovation work that is regulated by 40 CFR 745, comply with the work practice standards of that regulation.
- D. Perform waste battery storage and disposal in accordance with 40 CFR 261, 40 CFR 264, 40 CFR 265, 40 CFR 273 and 8 AAC.

- 3.4 MONITORING AND TESTING: Conduct daily sampling in accordance with the Contractor's accepted Sampling and Analysis Plan and this specification. The Owner may conduct air

REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

Division 2
Section 02 83 33

monitoring in the Contractor's work areas and on the Contractor's employees.

- A. Perform environmental air monitoring outside the lead work area for each lead work area without a negative initial determination. Take a minimum of two lead-in-air samples inside the work area, and two lead-in-air samples in adjacent areas.
- B. Perform dust wipe sampling for each lead work area without a negative initial determination. Include at least one sample immediately outside the entrance to the work area daily.
- C. Take personnel samples in accordance with 29 CFR 1926.62. Personal samples for an employee will include a minimum of two samples per 8-hour shift. Employees will be monitored at the rate of at least one employee for every eight people performing each task in each work area. Persons performing separate tasks or in separate lead work areas shall be sampled separately.
- D. Reduction of monitoring: For each operation for which the Negative Initial Determination established workers' exposure will be below the action level, the Contractor's IH may petition the Owner's Representative to recommend that the monitoring as required above be reduced for the specific task or operation.
- E. For renovation work that is regulated by 40 CFR 745, comply with any additional cleaning, inspection and testing standards of that regulation.

3.5 DISPOSAL

- A. Sampling of Waste Materials: The Contractor shall test waste materials according to 40 CFR 261 and the disposal site's permit to determine if they are hazardous waste and to dispose of them accordingly. Collect, package and transport to an EPA approved Hazardous Waste Disposal Site all bulk debris, loose paint chips, fines, dust from HEPA filters and vacuum bags, unfiltered wastewater, water filter cartridges, disposable personal protective equipment (including respirator filters, poly, and tape) which do not have TCLP test results that classify the material as non-hazardous for lead. Lead-acid batteries and other batteries are classified by the EPA as Universal Wastes. The EPA encourages that all Universal Wastes be recycled in accordance with 40 CFR 273, or in the case of lead-acid batteries, in accordance with 40 CFR 266, subpart G.
- B. Hazardous Waste Disposal: Dispose of hazardous project wastes as required by 40 CFR 260 and the Contractor's approved work plan.
- C. Construction (Non-Hazardous) Waste Disposal: Dispose of solid (non-hazardous) waste in a permitted waste facility, in accordance with applicable federal, state, and local laws and regulations. Burning of waste is prohibited.
- D. Salvageable Materials: The Contractor may salvage metallic lead, lead-acid batteries and other materials to keep such materials from entering the project waste stream. Sell or transfer salvage with a document of exempt status as provided by 40 CFR 261.
- E. Waste Storage: Temporarily store solid waste as described in the approved work plan.

- 3.6 FINAL CLEANING AND VISUAL INSPECTION: Perform a final cleaning and visual inspection of each lead control area prior to release to unprotected workers in accordance with the Contractor's approved work plan. Clean the lead control area by vacuuming with a HEPA filtered vacuum cleaner, wet mopping or wet wiping. Do not dry sweep or use pressurized air

REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

Division 2

Section 02 83 33

to clean up the area. A final visual inspection report shall be provided verifying that all lead disturbance required by the contract has been completed and that all visible dust and debris subject to disturbance by the planned work under this contract have been removed and the area HEPA vacuumed, wet mopped or wet wiped.

3.7 WORK AREA CLEARANCE TESTING: Work area clearance testing by the Contractor is required for each lead control area where the lead action level has been exceeded, or for work in child occupied facilities covered by 40 CFR 745. Clearance testing shall be performed only after a visual inspection report by the Contractor's IH Technician has documented that the work area is clean and that all lead disturbance required by the contract has been completed. Clearance testing shall include the following:

- A. A visual inspection report by the Contractor's IH Technician verifying that all lead disturbance required by the contract has been completed and that all visible dust and debris subject to disturbance by the planned work under this contract have been removed and the area HEPA vacuumed, wet mopped or wet wiped.
- B. Three (3) lead wipe and/or lead soil sample results from within the lead control area per the Contractor's approved work plan and in accordance with NIOSH method 9100. Clearance levels shall be 200 $\mu\text{g}/\text{ft}^2$ for wipes or 500 ppm in soil.
- C. For child-occupied facilities where lead-based paints have been disturbed, clearances shall be performed by an EPA certified lead inspector, risk assessor or certified dust sampling technician in accordance with 40 CFR 745. Dust clearance levels shall be below 10 $\mu\text{g}/\text{ft}^2$ for floors, 100 $\mu\text{g}/\text{ft}^2$ for interior windowsills, and 400 $\mu\text{g}/\text{ft}^2$ for window troughs, and below 40 $\mu\text{g}/\text{ft}^2$ for porch floors. Soil clearance levels shall be below 400 parts per million (ppm) for play areas and 1,200 ppm for bare soil in non-play areas.
- D. The Owner may conduct concurrent clearance testing.
- E. Work area barriers or containments shall not be removed until clearance testing results are reviewed and approved by the Owner.

3.8 SUBSTANTIAL COMPLETION

- A. After the work area barriers and temporary construction and equipment have been removed, the Contractor shall inspect the work area to verify that no lead debris, contaminated water, or other residue remains. Any remaining residue shall be cleaned up using HEPA vacuum cleaners and wet wiping methods.
- B. The Contractor shall certify that the work area has been cleaned of all lead in compliance with the contract, and that there is no unrepaired damage to walls, ceilings, doors or surfaces or finishes other than that called for by the scope of work.
- C. Costs of restoration of damaged finishes shall be borne by the Contractor.

END OF
SECTION

REMOVAL AND DISPOSAL OF CHEMICAL HAZARDS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK: The work includes proper removal and disposal of electrical equipment and chemical hazards related to the Bettye Davis East Anchorage High School Safety Upgrades Academic Area Project as shown on the drawings and as specified herein. Items to be removed or disturbed may include, but are not limited to:

- A. Mercury and mercury compounds in electrical equipment and light fixtures, switches, etc.
- B. PCB containing ballasts and light fixture components contaminated with PCB-containing oil.
- C. Heat transfer fluids.
- D. Universal Waste batteries for exit and emergency lights, and other equipment.
- E. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead, are also present in settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.
- F. Notification of Child Occupied Facility: Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01 35 45 Airborne Contaminant Control
- B. Section 02 26 00 Hazardous Materials Assessment
- C. Section 02 82 33 Removal and Disposal of Asbestos Containing Materials
- D. Section 02 83 33 Removal and Disposal of Materials Containing Lead

1.2 DEFINITIONS AND ABBREVIATIONS: Definitions and abbreviations are provided in the applicable publications listed in Paragraph 1.4 of this Section.

1.3 APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced.

REMOVAL AND DISPOSAL OF CHEMICAL HAZARDS

Division 2

Section 02 84 18

- A. General Requirements: All work shall be performed in compliance with the International Building (IBC), Fire, Fuel Gas, Mechanical, Residential, Energy Conservation and Administrative Code; Uniform Plumbing Code; the National Electrical Code; and the publications listed in this section that are in effect at the time of the bidding of this contract.
- B. Title 10 Code of Federal Regulations (CFR), Nuclear Regulatory Commission Part 20 Standard for Protection Against Radiation
- C. Title 29 CFR, Department of Labor (USDOL)
 - Part 1910 General Occupational Safety and Health
 - Standards Part 1926 Safety and Health Regulations for Construction
- D. Title 40 CFR, Environmental Protection Agency (EPA)
 - Part 61 National Emission Standards for Hazardous Air Pollutants
 - Part 260 Hazardous Waste Management System: General
 - Part 261 Identification and Listing of Hazardous Waste
 - Part 262 Standards Applicable to Generators of Hazardous
 - Waste Part 263 Standards Applicable to Transporters of Hazardous
 - Waste Part 270 The Hazardous Waste Permit Program
 - Part 273 Standards for Universal Waste Management
 - Part 311 Worker Protection
 - Part 761 Polychlorinated Biphenyls (PCBs)
- E. Title 49 CFR, Department of Transportation (DOT)
 - Part 171 General Information, Regulations and Definitions
 - Part 172 Hazardous Materials Communication and Regulations
 - Part 173 General Requirements for Shipments and Packaging
 - Part 177 Carriage by Public Highway
 - Part 178 Specifications for Packagings
 - Part 382 Requirements for Drug Testing
 - Part 383 Commercial Driver's License Standards
- F. State of Alaska Administrative Codes (AAC)
 - 8 AAC 61 Occupational Safety and Health Standards
 - 18 AAC 60 Solid Waste Management
 - 18 AAC 62 Hazardous Wastes
 - 18 AAC 75 Oil and Hazardous Substances Pollution Control
- G. State of Alaska Statutes (AS)
 - AS 45.50.477 Titles Relating to Industrial Hygiene
- H. Federal Standards
 - 313E Safety Data Sheets
- I. American National Standard Institute (ANSI)
 - Z9.2 Local Exhaust
 - Systems
 - Z87.1 Eye and Face Protection
 - Z88.2 Practices for Respiratory Protection
 - C78.LL 1256 Procedures for Fluorescent Lamp Sample Preparation and Toxicity Characteristic Leaching Procedure.
- J. American Society for Testing and Materials (ASTM) D-4397 Polyethylene Sheeting

- K. International Code Council
International Building (IBC), Fire, Fuel Gas, Mechanical, Residential,
Energy Conservation and Administrative Code Current IC Standards
- L. National Fire Protection Association (NFPA)
NFPA 701 Fire Tests for Flame Resistant Textiles and Films
- M. National Institute of Occupational Safety and Health
(NIOSH) Manual of Analytical Methods, Current Edition

1.4 QUALITY ASSURANCE

A. On-site Observation:

1. The safety and protection of the Contractor's employees, sub-contractor's employees, Owner's employees, the facility, and the public is the sole responsibility of the Contractor.
2. The Owner, the Owner's Representative, or representatives of State or Federal agencies may make unannounced visits to the site during the work. The contractor shall make available two complete sets of clean protective clothing for such visitor use. If the work requires the use of PAPR or Supplied Air Respirators, the contractor shall provide respirators to the visitor to ensure compatibility with fresh batteries or supplied air system. It is the visitor's responsibility to ensure medical qualification, training, and current "fit test" prior to using any respirator provided by the Contractor.
3. If the Owner or agency visitor determines that practices are in violation of applicable regulations, they will immediately notify the Contractor that operations must cease until corrective action is taken. Such notification will be followed by formal confirmation.
4. The Contractor shall stop work after receiving such notification. The work may not be restarted until the Contractor receives written authorization from the Owner.
5. All costs resulting from such a stop work order shall be borne by the Contractor and shall not be a basis for an increase in the contract amount or an extension of time.

B. Monitoring and Testing: Monitoring and testing during the work shall be performed as follows:

1. The Contractor shall hire Independent Testing Laboratories to collect and evaluate all air, bulk, and toxicity characteristic leaching procedure (TCLP) samples, which are the responsibility of the Contractor. The Contractor shall direct its laboratories, in writing, to release monitoring and testing data, and all other pertinent data and records, to the Owner.
2. The Contractor shall be responsible for monitoring its employees for potential exposure to airborne contaminants as required by specification 01 35 45 and all applicable regulations.
3. The Contractor shall be responsible for work area monitoring and environmental monitoring outside the work area as required by this specification. All sampling by the Contractor shall be at their own cost.
4. The Owner may perform monitoring and testing inside the building, inside the work areas, and on the Contractor's employees while work is underway and at any time during the work.
5. The Contractor shall have its Independent Testing Laboratories archive all

- samples until the successful completion of the project.
6. Final inspection and clearance testing shall be conducted by the Contractor.
- 1.5 PROTECTION OF EXISTING WORK TO REMAIN: Perform hazardous material removal work without damage or contamination of adjacent work or the site.
- 1.6 MEDICAL REQUIREMENTS
- A. Institute and maintain a medical surveillance program in accordance with 29 CFR 1910.134.
- B. Institute and maintain a random drug testing program, as required by 49 CFR 382, for all drivers of vehicles transporting hazardous materials.
- 1.7 TRAINING: Employ only workers who are trained and certified as required by 29 CFR 1910, 29 CFR 1926, 40 CFR 311, and 49 CFR 383 to remove, encapsulate, barricade, transport, or dispose of hazardous materials.
- 1.8 PERMITS AND NOTIFICATIONS: Secure necessary permits for hazardous material removal, storage, transport and disposal and provide timely notification as required by federal, state, and local authorities.
- 1.9 SAFETY AND ENVIRONMENTAL COMPLIANCE: Comply with laws, ordinances, rules, and regulations of federal, state, and local authorities regarding handling, storing, transporting, and disposing of hazardous materials and all other construction activities.
- 1.10 RESPIRATOR PROGRAM: Establish a respirator program as required by ANSI Z88.2 and 29 CFR 1910.134.
- 1.11 HAZARD COMMUNICATION PROGRAM: Implement a hazard communication program in accordance with 29 CFR 1910.1200.
- 1.12 SUBMITTALS
- A. Approval: Submit the following documentation to the Owner for review, approval, or rejection. Work shall not begin until submittals are approved.
1. Shop drawings.
 2. Hazardous material removal work plan.
 3. Liability insurance policy and performance bond.
 4. Schedule.
 5. Independent testing laboratories.
 6. Disposal site designations.
 7. Waste Transporter Designations.
 8. Notifications and certifications.
 9. Competent Person Designation Notifications and Certifications.
 10. Request for Substitutions.
- B. Shop drawings shall show:
1. Boundaries of all hazardous material removal areas.
 2. Location and construction of decontamination stations, if required.
 3. Location of temporary site storage facilities.
 4. Location of air monitoring stations, if required.
 5. Emergency egress route(s).

- C. The work plan shall include procedures for:
1. Work area set-up and protection.
 2. Worker protection and decontamination.
 3. PCB removal procedures.
 4. Mercury-containing lamp removal and packaging procedures.
 5. Mercury-containing material removal procedures.
 6. Monitoring and testing procedures (Sampling and Analysis Plan).
 7. Waste handling, packaging, labeling, manifesting and disposal procedures.
- D. Insurance Policy and Performance Bond: Submit copies of the Contractor's or Subcontractor's insurance policy and performance bond. Submittal requirement is only to ensure that the insurance certificate(s) show specific coverage for the potentially hazardous materials being handled by this project. The insurance and bond amounts and certificate holder requirements are addressed in other portions of the contract documents and are not covered as part of this submittal requirement.
- E. Schedule: Submit construction schedule by work area.
- F. Independent Testing Laboratories and Laboratory Personnel: Submit the name, location, and phone number of proposed independent testing laboratories, and the names and certifications of industrial hygiene technicians. Include the laboratory's accreditation. Not all laboratories will require all accreditations.
1. The Independent Testing Laboratories shall be acceptable to the Owner.
 2. Evidence that a laboratory has demonstrated proficiency in performing analyses according to Method 1311 TCLP, corresponding to the current version of Test Methods for Evaluating Solid Wastes (Chemical Physical Methods), SW-846. Evidence may include successful participation in a recognized inter-laboratory quality control program such as a laboratory certified by the California Health and Welfare Agency, Department of Health Services, or a more informal inter-laboratory quality control program.
 3. Submit the name, address, telephone number, and résumé of the Industrial Hygienist (IH) who prepared the Sampling and Analysis Plan and will oversee the on-site monitoring. Submit the names, addresses, and résumés of industrial hygiene technicians who may assist the IH for on-site tasks. The Contractor shall submit documentation that the IH has all the qualifications for the assigned duties as required by the Contractor's liability insurance policy.
 4. Submit copies of the Contractor's letters to the independent testing laboratories, directing each to release all the results for this project to the Owner, as these results become available and as specified herein.
- G. Disposal Site: Submit the name and location of the proposed Alaska Department of Environmental Conservation (DEC) or U.S. Environmental Protection Agency (EPA) permitted disposal sites.
- H. Waste Transporter: Submit the name, address and EPA Hazardous Waste Transporter identification number for the proposed waste transporters.
- I. Certifications, Permits, and Notifications: Obtain and submit copies of EPA Hazardous Waste Generator identification number for the purpose of accumulating hazardous waste in accordance with 40 CFR 262. Submit copies of refrigerant recovery technician's EPA certification and company name when refrigeration systems are being demolished or deactivated. If the site does not have an EPA ID

number for hazardous wastes, the contractor will need to assist the Owner in obtaining the EPA ID number, but the Owner will be available to sign the application documents and shipment records prepared by the contractor.

- J. Representations: Submit statement by the Contractor that records of employees' work assignments, certifications, respirator fit tests, and medical records are accurate, up-to- date, and available for inspection.
 - K. Competent Person: Submit the name and certifications of the Contractor's proposed Competent Person and a list of their previous projects. Certify that the Competent Person has the knowledge and training to supervise the work in compliance with the publications listed in Paragraph 1.4 above.
 - L. Substitutions: Submit requests for substitutions of materials, equipment and methods.
 - M. Updated Project Information: Submit changes to the submitted project information at least 24 hours prior to the effective time of change for the following:
 - 1. Updated schedules for hazardous material removal.
 - 2. Change in competent person.
 - 3. Changes to work plan.
- 1.13 TEST REPORTS: Submit the following documentation produced during the work as received:
- A. Project Daily Logs: Submit the previous day's Daily Logs. Logs shall include regulated area sign-in sheets and list of chemical hazards removed including quantities and locations of those materials, in the units used on the drawings. Claims for additional quantities will not be addressed unless daily quantities are submitted.
 - B. Monitoring and testing data sheets and laboratory reports.
- 1.14 PROJECT COMPLIANCE DOCUMENTS: Submit the following documents with the application for final payment.
- A. Daily sign-in sheets.
 - B. Contractor's actual "start and finish" project dates.
 - C. All hazardous waste shipping manifests.
 - D. Disposal site receipts, including manufacturer name and serial numbers from each radioactive exit sign (if removed).
 - E. All final laboratory results.
 - F. Submit legible copies of the each Worker's Hazardous Waste Operations and Emergency Response (HAZWOPR) cards and/or a copy of the refresher training certificate to show that all workers have received their initial training or an eight-hour refresher course within the past year.
- 1.15 SANITARY FACILITIES: Provide adequate toilet and hygiene facilities.
- 1.16 MATERIAL STORAGE: Store all materials subject to damage off the ground and secure from damage, weather, or vandalism.

- 1.17 ON-SITE DOCUMENTATION: The Contractor shall maintain on the job site, at a location approved by the owner, copies of the following data for safety procedures, equipment, and supplies used for the work.
- A. Equipment: Show the model, style, operations, and maintenance for the following, as applicable:
 - 1. Respirators, PAPR and canister types.
 - 2. Decontamination facilities.
 - 3. Specialized hazards handling equipment.
 - B. Expendable supplies: Maintain the manufacturer's safety data, and use the data for the following supplies:
 - 1. Coveralls and headgear.
 - 2. Boots, aprons, and gloves.
 - 3. Disposal containers.
 - 4. Solvents and degreasers.
 - C. Safety Data Sheets (SDS): Maintain SDSs for each encapsulant, surfactant, solvent, detergent, and other material proposed to be used.
 - D. Respirator Program: The Contractor's written respirator program.

PART 2 - PRODUCTS

- 2.1 PERSONAL PROTECTIVE EQUIPMENT: Provide personal protective clothing as approved and selected by the IH.
- A. Respirators: Provide personally issued and marked respirators approved by the National Institute of Occupational Safety and Health (NIOSH). Provide sufficient replacements for respirators with disposable canisters.
 - B. Provide filter cartridges approved for each airborne contaminant which may be present. NIOSH approved filter cartridges shall be used. At no time shall the permissible exposure limit (PEL) for the contaminant exceed the PEL listed in 8 AAC 61.1100.
 - C. Whole Body Protection: Provide approved aprons, gloves, goggles, face shields, and hard-hats, and other protective clothing as required to meet applicable safety regulations to all workers engaged in hazardous materials removal. Full facepiece respirators shall meet the requirements of ANSI Z87.1.
 - D. Provide protective personal equipment and clothing at no cost to the workers.
- 2.2 DECONTAMINATION UNIT: Provide a decontamination station in accordance with the Contractor's accepted work plan and applicable regulations.
- 2.3 WARNING SIGNS AND TAPE: Post warning signs and tape at the boundaries and entrances to chemical hazards removal areas. Signs required by other statutes, regulations, or ordinances may be posted in addition to, or in combination with, this warning sign.
- 2.4 WARNING LABELS: Affix warning labels to all hazardous waste disposal containers as described in the Contractor's approved Solid Waste Disposal Plan. Conform labeling to 49 CFR 100-199.

- 2.5 SPECIALIZED EQUIPMENT: Lamp crushers and other specialized equipment to consolidate, reduce or treat hazardous materials are classified as RCRA treatment and the EPA specifically prohibits the use of Drum Top Crushers for management of fluorescent lamps as universal waste unless an equivalency determination is made by the state.
- 2.6 EXPENDABLE SUPPLIES: Provide flame resistant 6-mil thick polyethylene sheet plastic in widths necessary to minimize seams.
- 2.7 SAFETY DATA SHEETS (SDSs): Provide SDSs for all chemical materials brought onto the work-site.
- 2.8 OTHER ITEMS: Provide other items, such as consumable materials, disposable and/or reusable cleaning equipment and hand tools, or miscellaneous construction equipment and materials, in sufficient quantity as necessary to fulfill and complete the requirements of the contract. Electrical equipment and supplies shall be UL listed.
- 2.9 ENCAPSULANTS: Encapsulants shall contain no toxic or hazardous substances. Encapsulants shall be compatible with the products to which they are applied and be compatible with any replacement products.

PART 3 - EXECUTION

3.1 WORK AREAS

- A. Electrical Power: Verify that the electrical power to the equipment being removed is deactivated, disconnected, and locked-out.
- B. Loaded Disposal Drums: The Contractor shall provide handling equipment to move disposal drums loaded with hazardous wastes.

3.2 PERSONNEL PROTECTION PROCEDURES

- A. All personnel entering the work area shall sign the daily log and put on clean protective clothing.
- B. Basic protective clothing shall consist of aprons, gloves, goggles, face shields, and hard hats--with the addition of approved full body coveralls, bib-type aprons, and respirators as conditions warrant.
- C. Make available a contaminated material disposal drum, 6-mil. plastic wrapping and tape, or appropriate bagging materials for leaking ballasts and/or oil-contaminated components.
- D. Decontamination Procedures: All personnel handling or removing hazardous materials will comply with the decontamination procedures as described in the approved work plan.

3.3 HAZARDOUS MATERIAL REMOVAL PROCEDURES: Conduct hazardous materials removal, handling, packaging, storage, transport and disposal in accordance with the Contractor's approved work plan, applicable regulations, and this specification.

- A. Perform PCB related work in accordance with 40 CFR 761, 8 AAC 61, 18 AAC 60 and 18 AAC 62.

- B. Perform mercury-containing lamps work in accordance with 40 CFR 261, 40 CFR 264, 40 CFR 265, 40 CFR 273 and 8 AAC.
 - C. Perform waste battery work in accordance with 40 CFR 261, 40 CFR 264, 40 CFR 265, 40 CFR 273 and 8 AAC.
 - D. Perform heat transfer fluid work in accordance with 40 CFR 261, 40 CFR 264, 40 CFR 265, 40 CFR 273 and 8 AAC.
- 3.4 MONITORING AND TESTING: Conduct daily sampling in accordance with the Contractor's accepted Sampling and Analysis Plan and this Specification. The Owner may conduct air monitoring in the Contractor's work areas and on the Contractor's employees.
- A. Personal, work area, and environmental monitoring for airborne contaminants shall be performed by industrial hygiene technicians who are employees of (one of) the Contractor's Independent Testing Laboratories.
 - B. Perform air monitoring in accordance with 29 CFR 1926, current EPA guidance, and as specified herein. Calibrate all sampling pumps on-site with a calibrated transfer standard before and after each sample. Built-in rotameters on pumps are not acceptable for calibration.
 - C. Monitor for all airborne contaminants listed in 29 CFR 1926.55 and 8 AAC 61.1100, which are produced by the Contractor's operations.
 - D. Contractor shall test waste materials as required by 40 CFR 261, the disposal site's permit, and its approved work plan. If performed, TCLP testing of fluorescent lamps shall comply with ANSI/NEMA Standard Procedure for Fluorescent Lamp Sample Preparation and Toxicity Characteristic Leaching Procedure, C78.LL 1256-2003 or latest version.
- 3.5 DISPOSAL
- A. Dispose of hazardous wastes in an EPA permitted hazardous waste disposal site as required by 40 CFR 260 and 40 CFR 761, the Contractor's approved plan, and the disposal site operator.
 - B. Comply with current waste disposal, handling, labeling, storage, and transportation requirements of the waste disposal facility, U.S. Department of Transportation, and EPA regulations.
 - C. Fluorescent, mercury vapor, metal halide and high pressure sodium lamps are classified by the EPA as hazardous mercury waste under the Universal Waste Rule under 40 CFR 273. Mercury and mercury-containing products are considered hazardous waste unless TCLP testing of the waste for mercury confirms the mercury content to be less than the EPA criteria of 0.2 mg/l. If mercury-containing lamps and thermostats are handled and disposed of in accordance with the Universal Waste Regulations, no TCLP test is required. If the Contractor chooses to perform a TCLP test of fluorescent lamps, the test shall be conducted in accordance with the requirements of ANSI/NEMA Standard Procedure for Fluorescent Lamp Sample Preparation and Toxicity Characteristic Leaching Procedure, C78.LL 1256-2003 or latest version.
 - D. Dispose or recycle universal waste batteries as required by 40 CFR 273, the Contractor's approved plan, and the disposal/recycling site operator.

- E. Waste heat transfer fluids (such as used heating/cooling system glycol or other circulating heating/cooling fluids) are a potentially hazardous waste and shall be drained and collected in appropriate waste containers for recycling or disposal. Fluids shall be TCLP tested prior to disposal to determine if the fluids are classified as hazardous or non-hazardous waste per the EPA's RCRA regulations governing hazardous wastes. Fluids that failed the TCLP test shall be packaged for disposal as hazardous waste.

3.6 CLEANING OF WORK AREA

- A. Remove all hazardous materials and debris within a work area. Wet clean all work area surfaces.
- B. Notify the Owner that hazardous materials removal has been completed and the work area is ready for visual inspection. Include a statement that all hazardous materials and debris in the work area have been removed as required by the contract.

END OF
SECTION

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.
- B. Notification of Child Occupied Facility: Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.03 SUMMARY

- A. Section Includes:
 - 1. Structural steel.

1.04 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

1.05 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.06 ACTION SUBMITTALS

- A. Product Data:
 - 1. Structural-steel materials.

- B. Shop Drawings: Show fabrication of structural-steel components.

1.07 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).
- B. Shop-Painting Applicators: Qualified in accordance with SSPC-QP 3.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. ANSI/AISC 303.
 - 2. ANSI/AISC 341.
 - 3. ANSI/AISC 360.
 - 4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- B. Connection Design Information:
 - 1. Option 1: Connection designs have been completed and connections indicated on the Drawings.

2.02 STRUCTURAL-STEEL MATERIALS

- A. Channels, Angles-Shapes: ASTM A36/A36M.

2.03 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.

1. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
 2. Mark and match-mark materials for field assembly.
 3. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
1. Cut, drill, or punch holes perpendicular to steel surfaces.
 2. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.04 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform shop tests and inspections.
1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.
1. Do not remove temporary shoring supporting composite deck construction and structural-steel framing until cast-in-place concrete has attained its design compressive strength.

3.03 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
- B. Maintain erection tolerances of structural steel within ANSI/AISC 303.
- C. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- D. Splice members only where indicated.
- E. Do not use thermal cutting during erection.
- F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.04 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

3.05 PROTECTION

- A. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- B. Touchup Painting: Cleaning and touchup painting are specified in Division 9.

END OF SECTION

STEEL DECKING

PART 1 - GENERAL

1.01 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.
- B. Notification of Child Occupied Facility: Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.03 SUMMARY

- A. Section Includes:
 - 1. Roof deck.
- B. Related Requirements:
 - 1. Section 05 12 00 "Structural Steel Framing" for shop- and field-welded shear connectors.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings:
 - 1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.05 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product Certificates: For each type of steel deck.
- C. Product Test Reports: For tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
 - 1. Power-actuated mechanical fasteners.
- D. Evaluation Reports: For steel deck, from ICC-ES.
- E. Field quality-control reports.

1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- C. Electrical Raceway Units: Provide UL-labeled cellular floor-deck units complying with UL 209 and listed in UL's "Electrical Construction Equipment Directory" for use with standard header ducts and outlets for electrical distribution systems.
- D. FM Global Listing: Provide steel roof deck evaluated by FM Global and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
 - 1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

PART 2 - PRODUCTS

2.01 ROOF DECK

- A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
 - 1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 50, zinc coating.
 - 2. Deck Profile: As indicated.
 - 3. Profile Depth: As indicated.

4. Span Condition: Triple span or more.
5. Side Laps: As indicated.

2.02 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 31 for overhang and slab depth.
- G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- I. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch thick, with factory-punched hole of 3/8-inch minimum diameter.
- J. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.
- K. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch-wide flanges and level recessed pans of 1-1/2-inch minimum depth. For drains, cut holes in the field.
- L. Galvanizing Repair Paint: ASTM A 780/A 780M.
- M. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
 - 1. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.03 ROOF-DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: As indicated.
 - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds as indicated.
 - 3. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 18 inches, and as follows:
 - 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
 - 2. Mechanically clinch or button punch.
 - 3. Fasten with a minimum of 1-1/2-inch-long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Lapped 2 inches minimum.
- D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld flanges to top of deck. Space welds not more than 12 inches apart with at least one weld at each corner.
1. Install reinforcing channels or zees in ribs to span between supports and weld.
- E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

3.04 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Field welds will be subject to inspection.
- C. Prepare test and inspection reports.

3.05 PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.
- B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on top surface of prime-painted deck immediately after installation, and apply repair paint.
 1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
 2. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."
- C. Repair Painting: Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."

END OF SECTION

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.01 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.
- B. Notification of Child Occupied Facility: Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.03 SUMMARY

- A. Section Includes:
 - 1. Roof rafter framing.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - 2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Welding certificates.

- C. Product Certificates: For each type of code-compliance certification for studs and tracks.
- D. Evaluation Reports: For nonstandard cold-formed steel framing, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- C. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association the Steel Framing Industry Association or the Steel Stud Manufacturers Association.
- D. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.01 COLD-FORMED STEEL FRAMING MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
 - 1. Grade: ST33H.
 - 2. Coating: G60, A60, AZ50, or GF30.

2.02 ROOF-RAFTER FRAMING

- A. Steel Rafters: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and properties as indicated on drawings.

2.03 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Anchor clips.

5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers and knee braces.
9. Joist hangers and end closures.
10. Hole-reinforcing plates.
11. Backer plates.

2.04 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Welding Electrodes: Comply with AWS standards.

2.05 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780/A 780M.
- B. Cement Grout: Portland cement, ASTM C 150/C 150M, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C 1107/C 1107M, and with a fluid consistency and 30-minute working time.
- D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.
- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

2.06 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 1. Fabricate framing assemblies using jigs or templates.
 2. Cut framing members by sawing or shearing; do not torch cut.
 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.
- C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error must not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.
- C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.03 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
1. Cut framing members by sawing or shearing; do not torch cut.
 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 072100 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.04 JOIST INSTALLATION

- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated.
- B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches.
 2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections.
- C. Space joists not more than 2 inches from abutting walls, and as indicated on drawings.
- D. Frame openings with built-up joist headers, consisting of joist and joist track or another combination of connected joists if indicated.
- E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement.

1. Install web stiffeners to transfer axial loads of walls above.
- F. Install bridging at intervals indicated. Fasten bridging at each joist intersection as follows:
1. Joist-Track Solid Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
 2. Combination Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.
- G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.
- H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.
- 3.05 ERECTION TOLERANCES
- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error must not exceed minimum fastening requirements of sheathing or other finishing materials.
- 3.06 FIELD QUALITY CONTROL
- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 3.07 REPAIRS AND PROTECTION
- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

EPDM MEMBRANE ROOFING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Section Includes:

1. Adhered EPDM membrane roofing system.
2. Substrate board
3. Adhered insulation system.
4. Vapor retarder.

1.02 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 RELATED SECTIONS

- A. Division 2 Section "Demolition"
- B. Division 6 Section "Rough Carpentry".
- C. Division 7 Section "Sheet Metal Flashing and Trim".
- D. Division 7 Section "Plaza Deck Roofing System"

1.04 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing Manual" for definitions of terms related to roofing work in this Section.

1.05 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience. All products installed on the roof system are to be approved by the Roofing System Manufacturer for the warranty specified.

- C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7. See structural for more information.
1. Field-of-Roof Uplift Pressure: -33 lbf/sq. ft
 2. Perimeter Uplift Pressure: -51 lbf/sq. ft.
 3. Corner Uplift Pressure: -72 lbf/sq. ft.

1.06 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
1. Base flashings and membrane terminations.
 2. Tapered insulation, including slopes.
 3. Manufacturer approved adhesive attachment ribbon patterns for adhered insulation for corner, perimeter, and field-of-roof locations.
 4. Manufacturer approved adhered insulation fastening patterns for concrete roof deck for corner, perimeter, and field-of-roof locations, approved by manufacturer.

1.07 INFORMATIONAL SUBMITTALS

- A. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that the designed roofing system complies with requirements specified in "Performance Requirements" Article.
1. The Manufacturer Certificate is to be submitted to the Owner within 15 days after formal Notice to Proceed from ASD.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
- D. Warranties: Samples of special warranties.
- E. Certificates: Manufacturer's inspection reports of final inspection for warranty.

1.08 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For membrane roofing system to include in maintenance manuals.
- B. Warranties.

1.09 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty. Installer is to have a minimum of five years of documentable experience installing similar roof systems and is to provide a list of references of same upon request by the Owner.
- B. Source Limitations: Obtain components including roof insulation fasteners and all other components for membrane roofing system from same manufacturer as membrane roofing or approved by membrane roofing manufacturer.
- C. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- D. Preinstallation Roofing Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, roofing Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 5. Review structural loading limitations of roof deck during and after roofing.
 - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 - 7. Review governing regulations and requirements for insurance and certificates if applicable.
 - 8. Review temporary protection requirements for roofing system during and after installation.
 - 9. Review roof observation and repair procedures after roofing installation.
 - 10. Combine meeting discussion items with those listed in Section 07 76 16.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.11 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Do not allow non-waterproof roofing products or uncoated felts to be exposed to moisture, rain, ice or snow. Roofing products are to be waterproofed on a daily basis.

1.12 WARRANTY

- A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 - 1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of membrane roofing system.
 - 2. Warranty Period: 20 years from date of Substantial Completion.
 - 3. Wind Warranty: To resist wind up to and including 110 MPH (3-second gust speed) as defined per the 2012 IBC.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, and walkway products, for the following warranty period:
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 EPDM MEMBRANE ROOFING

- A. EPDM: ASTM D 4637, Type II, scrim or fabric unreinforced, uniform, flexible EPDM sheet.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle SynTec Incorporated.
 - b. Firestone Building Products.
 - c. No substitutions.
 - 2. Thickness: 90 mils, nominal.
 - 3. Exposed Face Color: Black.

2.02 AUXILIARY MEMBRANE ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials approved by the roofing system manufacturer for specified warranty and intended use and compatible with membrane roofing.
- B. Sheet Flashing: 60-mil- thick EPDM, partially cured or cured, according to application.
- C. Bonding Adhesive: Manufacturers standard.
- D. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 3 inch wide minimum, butyl splice tape with release film.
- E. Lap Sealant: Manufacturer's standard, single-component sealant.
- F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- G. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- H. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- I. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer.
- J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories..

2.03 COVER BOARD

- A. SecurShield HD Plus Polyiso panel.
 - 1. 1/2" thick, high-density polyiso insulation panel with premium-performance coated glass facers (CGF).
 - 2. Maximum panel size: 4' x 4'.
 - 3. Approved equal acceptable to system Manufacturer.

2.04 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. All insulation layers are to be adhered with a manufacturer approved, cold applied adhesive, not asphalt.

- C. Molded-Polystyrene Board (EPS) Insulation: ASTM C 578 Type II, 1.35-lb/cu. ft. minimum density. The R-value for calculation purposes for Type II EPS insulation is to be R-4.17 per inch thickness, measured at 75 degrees F.
 - 1. Available Manufacturers:
 - a. Insulfoam, Inc.
 - b. Approved equal.
 - 2. Maximum dimension: 4 feet by 8 feet
- D. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 or 3/8 inch per 12 inches as indicated in drawings, unless otherwise indicated.
 - 1. Minimum thickness: 1/4-inch.
- E. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.05 EXTERIOR GYP SHEATHING

- A. Gypsum Wall Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, Type X, thickness as indicated in drawings.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Georgia-Pacific Corporation; "DensDeck Prime".
 - b. Approved equal.

2.06 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.
- B. Bead-Applied Insulation Adhesive: Manufacturer's recommended bead-applied, low-rise, one- or multi-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. If deck surface is not suitable for receiving new roofing, or framing, or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.
 - 2. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.

3. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations.
 4. Verify that Tectum deck substrate, if encountered, is visibly dry, sound and free of moisture.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.03 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install insulation under area of roofing to achieve required thickness. Install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- E. Install tapered insulation under area of roofing to conform to slopes indicated.
- F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- G. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:
 1. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place until adhesive sets.
 2. Adhere insulation to resist uplift pressure at corners, perimeter, and field of roof.
- H. Adhered Coverboard: Install coverboards and adhere to insulation substrate as follows:

1. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Stagger coverboard joints from joints in insulation below a minimum of 12 inches in each direction.
2. Set coverboard in ribbons of bead-applied insulation adhesive, loosely butting cover boards together. Firmly press and maintain coverboard in place with adequate pressure until cover board is bonded to insulation.
3. Adhere cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.04 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.
- B. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
- D. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters.
- E. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- F. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.
- G. Secondary Seam Flashing: Install Manufacturer's standard 6-inch wide peel & stick flashing tape over all completed seams in roofing membrane. Apply lap sealant to 6-inches each direction beyond all overlaps. Apply lap sealant to 6-inches beyond each endlap of 6-inch secondary flashing.
- H. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- I. Spread sealant or mastic bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.05 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturers' written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Secondary Flashing for Baseflashing Seams: Install Manufacturer's standard 6-inch wide peel & stick flashing tape over all completed flashings in roofing membrane. Apply lap sealant to 6-inches each direction beyond all overlaps. Apply lap sealant to 6-inches beyond each endlap of 6-inch secondary flashing.
- F. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.06 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified independent testing agency to perform inspections.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.07 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray, spillage, smears, etc from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.08 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: Anchorage School District.
2. Address: 1301 Labar Street, Anchorage, Alaska 99515.
3. Building Name/Type: ASD Bettye Davis East High School
4. Address: 4025 East Northern Lights Blvd. Anchorage, Alaska 99508
5. Area of Work: Roof of Exterior Entry Canopy
6. Acceptance Date:
7. Warranty Period:
8. Expiration Date:

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. Lightning.
 - b. Peak gust wind speed exceeding 110 mph;
 - c. Fire;
 - d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. Vapor condensation on bottom of roofing; and
 - g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said

alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

- 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
- 6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
- 7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, 20__.

Authorized Signature: _____.

Name: _____.

Title: _____.

END OF SECTION

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Formed sheet metal fabrications.

1.2 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each of the following

1. Underlayment materials.
2. Elastomeric sealant.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Include identification of material, thickness, weight, and finish for each item and location in Project.
3. Include details for forming, including profiles, shapes, seams, and dimensions.
4. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
5. Include details of termination points and assemblies.
6. Include details of special conditions.
7. Include details of connections to adjoining work.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Special warranty.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Sheet metal flashing and trim assemblies, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change: 120 deg F, ambient, material surfaces.

2.2 SHEET METALS

- A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Thickness: 24 gauge.
- C. Metallic-Coated Steel Sheet: Provide zinc-coated galvanized steel sheet in accordance with ASTM A653/A653M-10 CS Type B for Zinc coated (galvanized) steel sheets & coil.
 1. Surface: Smooth, flat.
 2. Exposed Coil-Coated Finish:

- a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
3. Color: As selected by Architect from manufacturer's full range.
4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.3 UNDERLAYMENT MATERIALS

- A. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F; and complying with physical requirements of ASTM D226/D226M for Type I and Type II felts.

2.4 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
 2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- D. Elastomeric Sealant: ASTM C920, elastomeric [polyurethane] [polysulfide] [silicone] polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

2.5 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
 4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances:
1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
 2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, non-expansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Seams:
1. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 2. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

PART 3 - EXECUTION

3.1 INSTALLATION OF UNDERLAYMENT

- A. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, in accordance with manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

1. Lap horizontal joints not less than 4 inches.
2. Lap end joints not less than 12 inches.

3.2 INSTALLATION, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
 3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
 4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
 5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
 6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
 8. Do not field cut sheet metal flashing and trim by torch.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
 2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
 3. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated.
 - a. Embed hooked flanges of joint members not less than 1 inch into sealant.
 - b. Form joints to completely conceal sealant.

- c. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
- d. Adjust setting proportionately for installation at higher ambient temperatures.

1) Do not install sealant-type joints at temperatures below 40 deg F.

- 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.3 INSTALLATION OF WALL FLASHINGS

- A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

3.4 INSTALLATION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 CLEANING

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.

3.6 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION

PLAZA DECK ROOFING SYSTEM

PART 1 - GENERAL

1.01 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.03 SUMMARY

- A. Section Includes:
1. Adhered EPDM membrane roofing system.
 2. EPDM accessory products.
 3. Protective Fabric.
 4. Cover Board.
 5. Rigid foam insulation.
 6. Spray Polyurethane Foam Insulation
 7. Spray on Thermal Barrier
 8. Paver pedestals.
 9. Concrete pavers
- B. Related Requirements:
1. Section 2 Section "Demolition"
 2. Division 22 Section "Plumbing Piping".

1.04 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing Manual" for definitions of terms related to roofing work in this Section.

1.05 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base liquid applied flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing

manufacturer based on testing and field experience. All products installed on the roof system are to be approved by the Roofing System Manufacturer for the warranty specified.

- C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.
- D. Provide tested assembly achieving the FM Class IA-225 rating in accordance with RoofNav #429676-0-0.

1.06 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Base flashings and membrane terminations.
 - 2. Tapered insulation, including slopes.
 - 3. Manufacturer approved adhesive attachment ribbon patterns for adhered cover board to insulation for corner, perimeter, and field-of-roof locations.
 - 4. Manufacturer approved adhesive requirements for adhered membrane to cover board and tapered insulation to concrete deck application for corner, perimeter, and field-of-roof locations, approved by manufacturer.
- C. Samples for Verification: For the following products, in manufacturer's standard sizes:
 - 1. 6-by-6-inch square of roof insulation.
 - 2. 12-inch length of metal termination bars.
 - 3. Pedestals.
 - 4. Concrete paver.

1.07 INFORMATIONAL SUBMITTALS

- A. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that the designed roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. The Manufacturer Certificate is to be submitted to the Owner within 15 days after formal Notice to Proceed from UAA.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
- D. Warranties: Samples of special warranties.
- E. Certificates: Manufacturer's inspection reports of final inspection for warranty.

1.08 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For membrane roofing system to include in maintenance manuals.
- B. Warranties.

1.09 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty. Installer is to have a minimum of five years of documentable experience installing similar roof systems and is to provide a list of references of same upon request by the Owner.
- B. Source Limitations: Obtain components including roof insulation fasteners and all other components for membrane roofing system, insulation and the paver overburden assembly from same manufacturer as membrane roofing manufacturer.
- C. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- D. Preinstallation Roofing Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, General contractor, roofing installer, and installers whose work interfaces with or affects roofing, including installers of pedestals and pavers accessories equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 5. Review base flashings, special membrane details, deck drainage, drains, and condition of other construction that will affect roofing system.
 - 6. Review governing regulations and requirements for insurance and certificates if applicable.
 - 7. Review temporary protection requirements for plaza deck roof system during and after installation.
 - 8. Review roof observation and repair procedures after roofing installation.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

2. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
3. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.11 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Do not allow non-waterproof roofing products or uncoated felts to be exposed to moisture, rain, ice or snow. Roofing products are to be waterproofed on a daily basis.

1.12 WARRANTY

- A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of plaza paver system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 1. Special warranty includes membrane roofing, base flashings, liquid flashing terminations, insulation, fasteners, drainage mat, protection fabric, pedestals and pavers, accessories, and other components of membrane plaza deck roofing system.
 2. Warranty coverage shall include any necessary system de-construction to access the underlying membrane assembly to effect repairs.
 3. Warranty Period: 30 years with 120-mph peak gust wind speed coverage from date of Substantial Completion.
 4. Paver Material Warranty: 10 years from date of Substantial Completion.
- B. Special Project Warranty: Submit Deck Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, insulation, fasteners, cover boards, substrate boards, vapor retarders, and walkway products, for the following warranty period:
 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 EPDM MEMBRANE

- A. EPDM: ASTM D 4637, Type III, unreinforced uniform, fabric-backed, flexible EPDM sheet.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle SynTec Incorporated. (Basis of Design)
 - b. Firestone Building Products.

c. No substitutions.

2. EPDM thickness: 90 mils, nominal.
3. Exposed Face Color: Black.

2.02 AUXILIARY MEMBRANE ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials approved by the roofing system manufacturer for specified warranty and intended use and compatible with membrane roofing.
- B. Sheet Flashing: 60-mil- thick EPDM, partially cured or cured, according to application.
- C. Pressure Sensitive PS Elastoform: 90-mil, according to application.
- D. Bonding Adhesive: Manufacturers Flexible FAST standard adhesive.
- E. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 6 inch wide minimum, butyl splice tape with release film.
- F. Liquid applied flashing (LAM): LIQUISEAL Liquid Flashing:
 1. Two-component polyurethane-based system reinforced, cold-applied liquid flashing compatible with EPDM membrane.
 2. EPDM primer:
 - a. LIQUISEAL Metal Primer.
 3. Concrete primer:
 - a. LIQUISEAL Concrete & Masonry Primer.
- G. Lap Sealant: Manufacturer's standard, single-component sealant.
- H. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- I. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- J. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer.
- K. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.03 COVER BOARD

- A. SecurShield HD Plus Polyiso panel.
 1. 1/2" thick, high-density polyiso insulation panel with premium-performance coated glass facers (CGF).
 2. Maximum panel size: 4' x 4'.
 3. Approved equal acceptable to system Manufacturer.

2.04 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. All insulation layers are to be adhered with a manufacturer approved, cold applied adhesives, asphalt is not permitted.
- C. Molded-Polystyrene Board (EPS) Insulation: ASTM C 578 Type II 15-21 PSI, 1.5-lb/cu. ft. nominal density.
 - 1. Available Manufacturers:
 - a. Insulfoam, Inc.
 - b. Approved equal acceptable to system Manufacturer.
 - 2. Maximum dimension: 4 feet by 4 feet
 - 3. Provide thickness as indicated on the drawings.
- D. Extruded-Polystyrene Board Insulation acceptable to system Manufacturer: ASTM D1621; ASTM C 578, Type IV 25 PSI..
 - 1. Available Manufacturers:
 - a. Dow STYROFOAM Brand DECKMATE Plus
 - b. Owens Corning:
 - i. Formular NGX 400 XPS.
 - ii. Approved equal acceptable to system Manufacturer.

2.05 SPRAY POLYURETHANE FOAM INSULATION (SPF)

- A. Sprayed Applied Closed-Cell Polyurethane Foam Insulation: ASTM C 1029, Type II, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
- B. Minimum density of 2 lb/cu. ft., thermal resistivity of 6.2 deg F x h x sq. ft./Btu x in. at 75 deg F.
 - 1. Acceptable Manufacturers are limited to the following:
 - a) BASF Corporation.
 - b) BaySystems NorthAmerica, LLC.
 - c) Dow Chemical Company (The).
 - d) Gaco Western Inc.
 - e) SPI, Specialty Products, Inc.
 - f) Alternate Brand Request or Substitution Request required.

2.06 PROTECTION FABRIC

- A. 300HV Protection Fabric:
 - 1. Nominal 4.7 oz. per square yard, UV-resistant, polypropylene, needle-punched fabric. Non-woven polypropylene fabric.

2.07 SPRAY ON THERMAL BARRIER

- A. Rated for spray on use over Spray Polyurethane Foam
- B. Provides 15 minute thermal barrier meeting AC377/AC456 testing; ASTM E84 and NFPA 286.
 - 1. Available Manufacturers and Products
 - a. International Fireproof Technology Inc.; Product DC315
 - b. Other approved equal products

2.08 PAVER PEDESTALS

- A. The contractor shall provide specified option depending on the selected concrete paver complying with System Manufacturer's warranty requirements:
 - 1. Bison.
 - 2. MRP Support pedestals.
 - 3. Hanover High Tab Pedestals.
 - 4. Hanover Elevator Pedestal.

2.09 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

2.10 PLAZA PAVERS

- A. The contractor shall provide at his manufacturers option either of the following concrete pavers:
 - 1. Westile Western Plaza Pavers:
 - a. Dimensions: 24" x 24" x 1.8125"
 - b. Finish: Shot Blast Texture.
 - c. Weight: 23 lb/sf
 - d. Color: To be selected from Manufacturer's standard.
 - 2. Hanover Prest Pavers:
 - a. Dimensions: 23.5" x 23.5" x 2"
 - b. Finish: "Tudor" Finish.
 - c. Weight: 25 lb/sf.
 - d. Color: To be selected from Manufacturer's standard.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. If deck surface is not suitable for receiving new roofing, or framing, or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.
 - 2. Verify that deck openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.

3. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations.
 4. Verify that deck substrate is visibly dry, sound and free of moisture.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.03 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.
- B. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
- D. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters.
- E. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- F. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.
- G. Secondary Seam Flashing: Install Manufacturer's standard 6-inch wide peel & stick flashing tape over all completed seams in roofing membrane. Apply lap sealant to 6-inches each direction beyond all overlaps. Apply lap sealant to 6-inches beyond each endlap of 6-inch secondary flashing.
- H. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- I. Spread sealant or mastic bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.04 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturers' written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Secondary Flashing for Baseflashing Seams: Install Manufacturer's standard 6-inch wide peel & stick flashing tape over all completed flashings in roofing membrane. Apply lap sealant to 6-inches each direction beyond all overlaps. Apply lap sealant to 6-inches beyond each endlap of 6-inch secondary flashing.
- F. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars at locations shown on drawings.
- G. Liquid applied flashing:
 - 1. Terminate and seal top of sheet flashings and adhere to concrete substrate. Clean surface of EPDM with appropriate membrane cleaner. Rough up membrane surface with 60-grit sandpaper and wipe with membrane cleaner to remove any dust or dirt from sanding.
 - 2. Consult Manufacturer for proper cleaning and preparation of concrete surface for preparation instructions.
 - 3. Apply primer to EPDM specific to surface materials. Follow Manufacturers installation instructions for each product.
 - 4. Prepare LIQUSEAL Liquid Flashing Fleece and apply Resin following Manufacturers installation instructions.

3.05 INSULATION INSTALLATION

- A. Comply with membrane roofing system and insulation manufacturer's written instructions for installing deck insulation.
- B. If any residual asphaltic materials are present on the deck surface, it must be primed with Cav-Grip III or 702 primer prior to the application of the Flexible Fast adhesive.
- C. Install adhered insulation over concrete deck to achieve required thickness. Butt joints closely together.
- D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
 - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

- F. Terminate and seal top of sheet flashings to concrete edges with liquid applied flashing at locations where shown on drawings.

3.06 PROTECTION FABRIC INSTALLATION

- A. Unroll fabric mat directly over the deck insulation:
 - 1. Position the next roll of fabric to overlap the first piece a minimum of 2".
 - 2. Install according to manufacturer's written instructions.

3.07 PAVER INSTALLATION

- A. Clean and prepare deck in accordance with Manufacturer's written instructions.
- B. Install appropriate paver pedestal required by paver system selected.
- C. Establish pattern with accurate lines and level.
- D. Establish grid pattern for pedestals. Lay out and level
- E. Install pavers according to Manufacturer's written instructions.

3.08 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified independent testing agency to perform inspections.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.09 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray, spillage, smears, etc. from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.10 PLAZA DECK INSTALLER'S WARRANTY

WHEREAS _____ of _____, herein called the "Deck Installer," has performed roofing and associated work ("work") on the following project:

Owner: Anchorage School District.
 Address: 1301 Labar Street; Anchorage, AK 99515.
 Building Name: Bettye Davis East High School
 Address: 4025 E. Northern Lights Blvd; Anchorage, AK 99508
 Area of Work: Plaza Deck
 Acceptance Date:
 Warranty Period:
 Expiration Date:

AND WHEREAS Roofing Membrane Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

NOW THEREFORE Deck Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

This Warranty is made subject to the following terms and conditions:

Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

- Lightning;
- Fire;
- Failure of building structural system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
- Faulty construction of not related to the Work of this project work and;
- Activity on decking by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Deck Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

Deck Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

During Warranty Period, if Owner allows alteration of work by anyone other than Deck Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Deck Installer to perform said alterations, Warranty shall not become null and void unless Deck Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more

severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

Owner shall promptly notify Deck Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Deck Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.

This Warranty is recognized to be the only warranty of Deck Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Deck Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, 202__.

Authorized Signature: _____.

Name: _____.

Title: _____.

END OF SECTION

JOINT SEALANTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. NOTIFICATION OF POTENTIAL HAZARDS: asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. all trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. refer to specification divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. this notification is provided in accordance with the EPA and OSHA requirements.

1.03 SUMMARY

- A. This Section includes the following:
 - 1. Non-fire rated sealants and backing materials.
 - 2. Joint sealants between metal flashings.
 - 3. Vapor retarder sealant.
- B. Related sections include the following:
 - 1. Division 7 Section "EPDM Membrane Roofing".
 - 2. Division 7 Section "Sheet Metal Flashing and Trim".

1.04 REFERENCES

- A. ASTM C 1193 – Standard Guide for use of Joint Sealants.

1.05 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.06 SUBMITTALS

- A. Submit shop drawings, product data, Material Safety Data Sheets (MSDS) and samples.
- B. Submit samples of sealant colors.
- C. Submit manufacturer's surface preparation and installation instructions.

1.07 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.

2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.08 SYSTEM REQUIREMENTS

- A. Building Sealants: Work shall be water tight, and resist passage of moisture and vapor.
- B. Building Movement: Installed systems shall be flexible to allow for normal movement of building and penetrating items without affecting the adhesion or integrity of the system.
- C. All materials shall be free of asbestos, and emit no toxic fumes or vapors.

PART 2 - PRODUCTS

2.01 URETHANE SEALANT MATERIALS

- A. General: No Silicone Sealant to be used on Project.
- B. All Exterior Locations: Polyurethane base, single component, solvent curing; capable of withstanding movement of up to 50 percent of joint width and satisfactorily applied throughout a temperature range of 40 to 80 degrees F Shore A hardness of maximum 50; non-staining; color as selected:
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bostik Findley; Chem-Calk 900.
 - b. Bostik Findley; Chem-Calk 915.
 - c. Bostik Findley; Chem-Calk 916 Textured.
 - d. Schnee-Morehead, Inc.; Permathane SM7100.
 - e. Schnee-Morehead, Inc.; Permathane SM7108.
 - f. Schnee-Morehead, Inc.; Permathane SM7110.
 - g. Sika Corporation, Inc.; Sikaflex - 15LM
 - h. Tremco; DyMonic.
 - i. Tremco; Vulkem 921.
 - j. Tremco; Vulkem 931.
 - k. Substitutions: Approved equal.

2.02 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.03 ACCESSORIES - SEALANT SYSTEMS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that joint dimensions, physical and environmental conditions are acceptable to receive work of this Section.
- B. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
- B. Clean, prepare, and size joints in accordance with manufacturer's instructions.
- C. Verify that joint shaping materials and release tapes are compatible with sealant.
- D. Examine joint dimensions and size materials to achieve required width/depth ratios.
- E. Use primer where required by manufacturer's installation instructions.
- F. Use bond breaker where required by manufacturer's installation instructions.
- G. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION

- A. Perform work in accordance with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- B. Install sealant in accordance with manufacturer's instructions.
- C. Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature ranges.

- D. Tool joints concave, unless otherwise indicated.
- E. At sheetmetal joints, provide double beads of sealant to seal lap joints.
- F. Joints: Free of air pockets, foreign embedded matter, ridges, and sags.

3.04 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated prefinished steel doors and frames.

1.02 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 RELATED REQUIREMENTS

- A. Division 8, Section "Finish Hardware".
- B. Division 8, Section "Glazing": Glass for doors and borrowed lites.
- C. Division 9, Section "Painting and Coating": Field painting and for touch-up work.

1.04 REFERENCE STANDARDS

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2003.
- B. ANSI A250.3 - Test Procedure and Acceptance Criteria for Factory-Applied Finish Painted Steel Surfaces for Steel Doors and Frames; 2007.
- C. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003.
- D. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2004).
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc- Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2010.
- F. ASTM C236 - Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box; 1989 (Reapproved 1993).
- G. ASTM C1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus; 2005.
- H. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.
- I. NAAMM HMMA 860 - Guide Specifications for Hollow Metal Doors and Frames; The National

Association of Architectural Metal Manufacturers; 1992.

- J. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2006.
- K. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2010.
- L. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association; 2008.
- M. UBC Std 7-2, Part II - Test Standard for Smoke- and Draft-control Assemblies; International Conference of Building Officials; 1997.
- N. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- O. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- P. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- Q. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

1.05 SUBMITTALS

- A. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage, fastening methods and finishes.
- B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- C. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- D. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with a minimum of three years documented experience.
- B. Maintain at the project site a copy of all reference standards dealing with installation.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel Doors and Frames:

1. Ceco Door Products
2. Curries Company
3. Steelcraft
4. Republic Builders Products
5. Mesker
6. Substitutions: See Division 1 for Substitution Request Procedures.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:

1. Accessibility: Comply with ANSI/ICC A117.1.
2. Door Top Closures: Flush with top of faces and edges.
3. Door Edge Profile: Beveled on both edges.
4. Door Texture: Smooth faces.
5. Glazing Stops: Metal non-removable stops on secured side of doors. Provide removable glazing stops on un-secured side; formed steel, butted corners prepared for countersink style tamper-proof head screws.
6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
7. Galvanizing for Units in Wet Areas: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.
8. Finish: Factory Primed, field finished.

- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL DOORS

A. Exterior Doors:

1. SDI-100 Level 4, physical performance Level A, Model 2, continuously welded seam dressed smooth, 14 gauge.
2. Shall be in accordance with SDI half lite.
3. Thickness: 1-3/4 inches (44mm)
4. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in

accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.

5. Non-fire rated doors shall have polyurethane core.
6. Insulating Value: U-value of 0.50, when tested in accordance with ASTM C1363-11.
7. Finish: Factory Primed, field finished.

2.04 STEEL FRAMES

A. General:

1. Finish: Factory Primed, field finished.
2. Frames Wider than 48 Inches (1200 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.
3. Frames Installed Back-to-Back: Reinforce with steel channels anchored to floor and overhead structure.

B. Exterior Door Frames: Fully welded, thermally broken, seamless with joints filled.

1. SDI-100 Level 4 and Physical Performance Level A, minimum 14-gauge. Hardware preparation per SDI 107, except provide 12-gauge closer reinforcing.
2. Steel frames for doors, sidelights, and transoms to be one-piece unit types. Faces mitered at corners. Rabbet, soffit, and stop joints tightly closed miter or butt joints. Corners are completely back welded. Exposed welds ground smooth with no evidence of welds and a seamless appearance on exposed frame faces.
3. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
4. Insulating Value: U-value of 0.50, when tested in accordance with ASTM C1363-11.

C. Frame Anchors

1. Jamb Anchors:
 - a. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 - b. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).
 - c. Post installed Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
 - d. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

2.05 ACCESSORIES

- ### A. Anchoring Elements: Stainless Steel. Galvanized metal is unacceptable.

- B. Low Expansion Sprayed Applied Closed-Cell Polyurethane Foam Insulation: ASTM C 1029, Type II, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Corporation.
 - b. BaySystems NorthAmerica, LLC.
 - c. Dow Chemical Company (The).
 - d. Gaco Western Inc.
 - e. SPI, Specialty Products, Inc.
 - f. Alternate Brand Request or Substitution Request required.
 2. Minimum density of 2 lb/cu. ft., thermal resistivity of 6.2 deg F x h x sq. ft./Btu x in. at 75 deg F.
 3. Locations: As indicated in drawings and at all voids between door, window, louvers, and other penetrations and rough wall opening.

2.06 FINISH

- A. Texture: Smooth faces
- B. Provide metallic coated steel sheets with an A40 zinc-iron-alloy (galvannealed) coating.
- C. Provide at factory rust-inhibiting alkyd resin primer.
- D. Field paint doors, frames and glazing stops with a paint system compatible with the door manufacturer's primer consisting of two coats 100% oil alkyd corrosion resistant enamel, semi-gloss; Sherwin Williams "DTM or equivalent".

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.

3.02 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build up under covering; prevent corrosion.

3.03 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.04 INSTALLATION

- A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow Metal Door Frames: Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - 2. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - 3. Install frames with removable stops located on exterior side of opening.
 - 4. In-Place Construction: Secure frames in place with post installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
- C. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.
- D. Coordinate installation of hardware.
- E. Touch up damaged factory finishes.

3.05 TOLERANCES

- A. Clearances Between Door and Frame: As specified in ANSI A250.8.
- B. Maximum Diagonal Distortion: 1/16 in (1.5 mm) measured with straight edge, corner to corner.

3.06 ADJUSTING

- A. Adjust for smooth and balanced door movement.

3.07 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

ACCORDION-FOLDING FIRE DOORS

PART 1 – GENERAL

1.01 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.02 SUMMARY OF WORK

- A. Division 0 and 1, as indexed, apply to this section.
- B. Furnish and install all horizontal-sliding accordion-folding fire access-control doors shown on the drawings and specified herein.

1.03 RELATED SECTIONS

- A. All headers, support structures, fire protection of support structures, surrounding insulation, jambs, storage pockets, blocking and trim shall be furnished and installed by other sections.
- B. All electrical wire, wiring, conduit and electrical boxes shall be furnished and installed by electrical section including connections to smoke detectors and building fire and access control alarm panels.
- C. Drilling/placement of anchorage points into pre or post tensioned decks, welding/punching/drilling steel members and all drywall work by other sections.
- D. All track, soffit, chain guide and striker shall be painted by Section 09 90 00. Color shall be selected by the architect.

1.04 QUALITY ASSURANCE

- A. Installation shall be performed by factory trained and certified installers with experience installing electrically operated accordion folding fire doors.
- B. Fire doors shall be listed by Underwriters Laboratories for ratings as indicated, when tested in accordance with the requirements of UL 10B and NFPA 252.
- C. Automatic closing system shall be listed by Underwriters Laboratories in accordance with the requirements of UL 864 and UL 294, and in compliance with NFPA 80.
- D. Fire doors used for smoke and draft control shall bear the "S" mark on the fire door UL label and shall have an air leakage of less than 3 CFM/ft² at 0.1 inch of water column pressure when tested in accordance with UL 1784.

1.05 SUBMITTALS

- A. See Section 01300 – Submittals, for submittal procedures.
- B. Product Data: Provide manufacturer's technical literature, include UL listing data.

- C. Shop Drawings: Indicate construction and installation details and dimensions, including layout, electrical requirements, required stack depth, height of header above finished floor, and requirements for anchorage and support of each door.
- D. Operation and Maintenance Data: Operating procedures, troubleshooting and repair methods, and wiring diagrams.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Manufacturer's agent will deliver original, unopened packages to a location designated by the General Contractor. All packages must be stored indoors, protected from moisture damage and secure from theft or other damage. General Contractor to note any damage or shortages at time of delivery.

1.07 COORDINATION BY GENERAL CONTRACTOR

- A. Coordinate with the following:
 - 1. Fire Alarm system.
 - 2. Electrical.
 - 3. Floor and ceiling finish.
- B. Assure accurate installation of header, jamb, and trim. Provide "As-Built" dimensions for opening and storage pocket. Supervise unloading and handling of materials.
- C. Store boxes flat (not more than three high) in a protected dry area.
- D. Permanent power shall be in-place and ready for final connection when fire and access control doors are installed. Assure access to and proper clearance for motor operators.
- E. After testing the fire alarm system, automatic-closing fire doors shall be re-set to the original position.

1.08 WARRANTY

- A. Materials and installation shall be warranted against defects in workmanship for a period of two (2) years from the date of substantial completion.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Horizontal-sliding, accordion-folding, fire doors as manufactured by Won-Door Corporation or approved equal.

2.02 ACCORDION FIRE DOORS – GENERAL

- A. Provide electrically powered self-closing fire doors of configurations indicated on the drawings.
 - 1. Fire rating as required.
- B. Fire Rating – Fire doors shall be listed by Underwriters Laboratory as special purpose fire doors having a 90-minute fire protection rating in accordance with the requirements of UL 10B and NFPA 252.
- C. Closing and Opening Operation: Automatic Closing System, listed to UL864 and UL294 including motor operator and releasing devices shall be a Microprocessor-based system and shall commence closing upon activation by fire signal, access control signal, low battery voltage or optional low AC voltage.

1. Obstruction Detection: Contact with an obstruction shall cause the door to stop, reverse enough to remove pressure on the leading edge, pause, and then re-close when in an alarm condition.
 2. Constant pressure to the leading edge while not under motor power shall prevent motor operation and allow the door to be opened manually.
- D. Exit Device Operation: Provide an exit device on one or both sides of door.
1. In emergency mode, a slight pressure on the exit device will cause the door to open fully, pause for 3 seconds, and then automatically close.
 2. The open distance shall be field programmable, up to the entire opening width.
 3. The pause before re-close shall be field programmable up to 30 seconds.
 4. The exit device shall have the ability when not in the emergency (fire) mode to be used to open the door and move it back into the storage pocket.

2.03 COMPONENTS

- A. Door Construction: Two parallel, accordion-type walls independently suspended with no floor tracks or pantographs.
1. Panels: 24 gauge steel, V-grooved; modular in design; capable of in-place repair.
 2. Perimeter Seals: shall consist of continuous extruded sweeps attached to the top and bottom of the fire door to form a smoke and draft seal.
 3. Hanging Weight: 5.5 pounds per sq. ft. when extended across opening.
 4. Finish: All steel panels shall have factory-applied protective coatings.
 5. Color: Manufacturer's standard platinum.
- B. Suspension System: Two tracks, on 8 inch centers, attached to overhead structural support.
1. Track: 1/8" extruded aluminum.
 2. Panel Hangers: Panels shall be suspended by a steel hanger pin and ball bearing roller system.
- C. Power source shall be: 120 – 240 volt AC input. System operation voltage shall be dual sourced from DC power supply and backup battery.
- D. Automatic Closing System shall be listed to UL864 and UL294 including capability to send and receive signals from the Fire Control Panel and/or Access Control System, and shall consist of the following:
1. Microprocessor based Electronic Control box with the ability to:
 - a. Monitor dual power sources continually for peak performance including:
 - 1) Detect a missing battery, bad battery, or low battery condition.
 - 2) Detect if the charging circuit is bad.
 - 3) Detect fuse failures.
 - 4) Detect high or low AC conditions.
 - b. Monitor the health of the drive train.
 - c. Monitor inputs including faults associated with door block, exit device, patron hardware, and key switches.

- d. Run a “watch dog” monitoring circuit which will force a software restart in the event the software hangs, including tracking the number of resets that occur for diagnostic purposes.
 - e. Withstand aberrant voltages up to 120 volts AC on the fire alarm input circuit without damage including the ability to indicate that the alarm circuit has not been wired as a dry contact, “no voltage” circuit when errant voltages are applied to the circuit.
 - f. Communicate with other microprocessors on the system via an internal bus system.
 - g. Indicate faults or supervised information both locally and at a remote location.
2. Motor Operator Assembly including a DC gear-motor, drive sprocket, clutch, and position sensors. The motor shall drive the door by means of a chain. Standard motor drive speed will be 9” per second.
 3. Leading Edge shall be pressure sensitive such that contact with an obstruction shall cause the door to stop, pause for a minimum of 3 seconds, then re-close when in alarm mode.
 4. Exit Device will be located on each side of the door.
- E. The header shall be provided as an integrated part of the door assembly and shall include track, threaded rods and mechanical attachment hardware.

2.05 RELATED CONSTRUCTION

- A. Track Support Construction: Provide supports attached to structure and mounting surface for track including drilling/placement of anchorage points into pre or post tensioned decks, welding/punching/drilling steel members, and all drywall work; comply with door manufacturer’s instructions and recommendations.
- B. Pocket Construction: Provide rated pocket as specified for storage of accordion door when open; comply with door manufacturer’s instructions and recommendations.
- C. Protection: Protect installed work from damage.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that adjacent construction is suitable for installation of door.
- B. Verify that electrical utilities have been installed and are accessible.
- C. Verify clear opening dimensions and that door opening is plumb.
- D. Notify Architect of any unacceptable conditions or varying dimensions.

3.02 INSTALLATION

- A. Install in accordance with manufacturer’s instructions, shop drawings and NFPA 80.
- B. Install fire doors plumb and parallel with the finished floor.
- C. Installation shall be performed by factory trained and certified installers with experience installing electrically operated accordion folding fire doors.

3.03 ADJUSTING

- A. Adjust door installation to provide uniform clearances and smooth, quiet, non-binding operation.
- B. Test that all operations are functional and meet the requirements of local codes.

3.04 CLEANING

- A. Clean surfaces using manufacturer's recommended means and methods.

END OF SECTION

ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass and tactile porcelain metal panels.

1.02 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.03 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.04 PERFORMANCE REQUIREMENTS

A. General Performance:

1. Product to comply with the specified performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction, as determined by testing of aluminum storefront systems representing those indicated for this project.
2. Aluminum storefront systems shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
3. Failure includes any of these events:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Loosening or weakening of fasteners, attachments, and other components.
 - d. Failure of operating units.

B. Wind Loads: As indicated on Drawings.

C. Air Leakage:

1. The test specimen shall be tested in accordance with ASTM E 283.
2. With interior seal, air leakage rate shall not exceed 0.06 cfm/ft^2 ($0.3 \text{ l/s} \cdot \text{m}^2$) at a static air pressure differential of 6.2 psf (300 Pa).
3. Without interior seal, air leakage rate shall not exceed 0.06 cfm/ft^2 ($0.3 \text{ l/s} \cdot \text{m}^2$) at a static air pressure differential of 1.6 psf (75 Pa).
4. CSA A440 Fixed Rating

D. Water Resistance:

1. The test specimen shall be tested in accordance with ASTM E 331.
2. There shall be no leakage at a minimum static air pressure differential of 10 psf (383 Pa) as defined in AAMA 501.

E. Uniform Load:

1. A static air design load of 35 psf (1680 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330.
2. There shall be no deflection in excess of $L/175$ of the span of any framing member.
3. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.

F. Seismic:

1. When tested to AAMA 501.4, system must meet design displacement (elastic) of $0.010 \times$ the story height and ultimate displacement (inelastic) of $1.5 \times$ the design displacement.
2. Thermal Movements:
3. Allow for thermal movements resulting from the following:
4. 0°F (-18 C) to 180°F (82 C) maximum change (range) in ambient and surface temperatures
5. 75°F (24 C) test interior ambient air temperature. Test performance shows no buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5 for a minimum 3 cycles.

G. Thermal Transmittance (U-factor):

1. Thermal transmittance test results are based upon 1" (25.4 mm) clear high-performance insulating glass [$1/4$ " ($e=0.035$, #2), $1/2$ " warm edge spacer and argon fill gas, $1/4$ "].
2. When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than:

3. Overall U-value Including Glazing: 40, maximum.

H. Condensation Resistance Factor (CRF):

1. The glass to exterior CRF, when tested to AAMA Specification 1503, shall not be less than 70_{frame} and 69_{glass} (low-e) or 69_{frame} and 58_{glass} (clear)
2. The glass to center CRF, when tested to AAMA Specification 1503, shall not be less than 62_{frame} and 68_{glass} (low-e) or 63_{frame} and 56_{glass} (clear)
3. The glass to interior CRF, when tested to AAMA Specification 1503, shall not be less than 56_{frame} and 67_{glass} (low-e) or 54_{frame} and 58_{glass} (clear)

1.05 REFERENCE STANDARDS

- A. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- D. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.
- E. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014 (Reapproved 2021).

1.06 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.07 SUBMITTALS

- A. See City of Valdez Standard Construction Specifications: Article 5.5, Shop Drawings for submittal procedures.
- B. Product Data
 1. For each type of aluminum-framed storefront system indicated, include:
 - a. Construction details
 - b. Material descriptions
 - c. Dimensions of individual components and profiles
 - d. Hardware

- e. Finishes
- f. Installation instructions
- 2. Recycled Content:
 - a. Provide documentation that aluminum has a minimum of 50% mixed pre- and post- consumer recycled content.
- C. Product Test Reports:
 - 1. Provide test reports for each type of aluminum-framed storefront used in the project. Test reports must be based on evaluation of comprehensive tests performed by a qualified preconstruction testing agency.
 - 2. Test reports must indicate compliance with performance requirements.
- D. Shop Drawings of each type of product:
 - 1. Plans
 - 2. Elevations
 - 3. Sections
 - 4. Details
 - 5. Hardware
 - 6. Attachments to other work
 - 7. Operational Clearances
 - 8. Installation Details
- E. Delegated Design:
 - 1. Aluminum Storefront System and Attachment To Existing Building Components
 - a. Performance and Design Criteria:
 - 1) Loads: As indicated in the drawings.
 - 2) Provide analysis data and calculations sealed and prepared by a qualified professional engineer licensed in the State of Alaska.
 - b. Aluminum Storefront System: Design aluminum storefront systems and attachments to existing building components, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
 - 1) Loads: As indicated in the drawings.
 - 2) Provide analysis data and calculations sealed and prepared by a qualified

professional engineer licensed in the State of Alaska.

- F. Field Conditions Documentation: Provide drawings indicating field verified measurements dimensions of all window types, rough openings, and precast concrete thicknesses prior to submitting Shop Drawings or fabrication storefront systems.

1.08 QUALITY ASSURANCE

A. Installer Qualifications:

- 1. Installer must have successfully installed the same or similar units required for the project and other projects of similar size and scope.

B. Manufacturer Qualifications:

- 1. Manufacturer must be capable of providing aluminum-framed storefront systems that meet or exceed performance the stated performance requirements.
- 2. Manufacturer must document this performance by the inclusion of test reports and calculations.

C. Source Limitations:

- 1. Obtain aluminum-framed storefront and operable window sash system through one source from a single manufacturer.

D. Product Options:

- 1. Drawings indicate size, profiles, and dimensional requirements of aluminum-framed storefront system and are based on the specific system indicated. Refer to Division 1 Product Requirements Section. Do not modify size and dimensional requirements.
- 2. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.09 PROJECT CONDITIONS

A. Field Measurements:

- 1. Verify actual locations of structural supports for aluminum storefront systems by field measurements before fabrication.
- 2. Indicate measurements on shop drawings.

1.10 WARRANTY

A. Submit manufacturer's standard warranty for owner's acceptance.

B. Warranty Period:

- 1. Two years from Date of Substantial Completion of the project provided however that in no event shall the Limited Warranty begin later than six months from date of shipment by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Product: Kawneer North America; Trifab VersaGlaze 451T Framing System.
 - 1. 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension
 - 2. Thermal
 - 3. Center glazed.
 - 4. Screw spline, shear block, stick, or punched opening
- B. Other Acceptable - Aluminum-Framed Storefronts Manufacturers:
 - 1. Arcadia, Inc: www.arcadiainc.com/#sle.
 - 2. Oldcastle Building Envelope: www.oldcastlebe.com/#sle.
- C. Substitutions: See Substitution Procedures in Division 01.

2.02 MATERIALS

- A. Aluminum Extrusions:
 - 1. Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish
 - 2. Not less than 0.070" (1.8 mm) wall thickness at any location for the main frame
- B. Complying with ASTM B221: 6063-T6 alloy and temper
- C. Recycled Content:
 - 1. Shall have a minimum of 50% mixed pre- and post-consumer recycled content.
 - 2. Indicate recycled content, including the percentage of pre- and post-consumer recycled content per unit of product.
 - 3. Indicate the relative dollar value of recycled content product to the total dollar value of product included in the project.
 - 4. Indicate the location for recovery of recycled content.
 - 5. Indicate the location of the manufacturing facility.
- D. Fasteners:
 - 1. Aluminum, nonmagnetic stainless steel or other materials must be non-corrosive and compatible with aluminum members, trim hardware, anchors, and other components.
- E. Anchors, Clips, and Accessories:

1. Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating.
2. Anchors, clips, and accessories shall provide sufficient strength to withstand the design pressure indicated.

F. Reinforcing Members:

1. Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating.
2. Reinforcing members must provide sufficient strength to withstand the design pressure indicated.

G. Sealant:

1. For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

H. Tolerances:

1. References to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.03 STOREFRONT FRAMING SYSTEM

A. Thermal Barrier:

1. Thermal Break with dual nominal 1/4" (6.4 mm) separation consisting of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively joined to aluminum storefront sections.
2. Thermal break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

B. Brackets and Reinforcements:

1. Manufacturer's standard high-strength aluminum with non-staining, non-ferrous shims for aligning system components.

C. Fasteners and Accessories:

1. Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories must be compatible with adjacent materials.
2. Where exposed, fasteners and accessories shall be stainless steel.

D. Perimeter Anchors:

1. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

- E. Packing, Shipping, Handling, and Unloading:
 - 1. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- F. Storage and Protection:
 - 1. Store materials so that they are protected from exposure to harmful weather conditions.
 - 2. Handle material and components to avoid damage.
 - 3. Protect material against damage from elements, construction activities, and other hazards before, during, and after installation.

2.04 GLAZING SYSTEMS

- A. Glazing: Per Section 08 80 00 Glazing
- B. Glazing Gaskets:
 - 1. Replaceable, extruded EPDM rubber
- C. Spacers and Setting Blocks:
 - 1. Manufacturer's standard elastomeric type
- D. Bond-Breaker Tape:
 - 1. Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- E. Glazing Sealants for structural-sealant-glazed systems as recommended by manufacturer for joint type, and as follows:
 - 1. Structural Sealant:
 - a. ASTM C 1184
 - b. Single-component neutral-curing silicone formulation that is compatible with the system components with which it comes in contact.
 - c. Specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in the aluminum-framed systems indicated.
 - d. Color: Black
 - 2. Weatherseal sealant:
 - a. ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O
 - b. Single-component neutral-curing formulation that is compatible with the structural sealant and other system components with which it comes in contact.

- c. Recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
- d. Color: Matching structural sealant

2.05 PORCELAIN ENAMEL METAL PANELS

- A. Porcelain enamel on steel sheets.
- B. Core material calcium silicate board with G90 galvanized steel.
- C. Finish and color: textured in white to match, or closely match, adjacent existing panels.
- D. Manufacturer: Porcelain Enamel Metal Cladding by Architectural Materials or equal.

2.06 FABRICATION

- A. Fabricate framing member components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints that are flush, hairline, and weatherproof.
 - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
 - 4. Physical and thermal isolation of glazing from framing members.
 - 5. Accommodations for thermal and mechanical movements of glazing and framing that maintain required glazing edge clearances.
 - 6. Provisions for field replacement of glazing.
 - 7. Fasteners, anchors, and connection devices that are concealed from view to the greatest extent possible.
- B. Mechanically Glazed Framing Members:
 - 1. Fabricate for flush glazing without projecting stops.
- C. Storefront Framing:
 - 1. Fabricate components for assembly using manufacturer's standard installation instructions.
- D. After fabrication, clearly mark components to identify their locations in project according to shop drawings.

2.07 ALUMINUM FINISHES

- A. Finish designations that are prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Factory Finishing:

1. Permafluor™ (70% PVDF), AAMA 2605, Fluoropolymer Coating
 - a. Color: As selected by Architect of Manufacturer's Full Range.
- C. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

PART 3 EXECUTION

3.01 EXAMINATION

- A. With installer present, examine openings, substrates, structural support, anchorage, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work:
 1. Verify rough opening dimensions.
 2. Verify levelness of sill plate.
 3. Verify operational clearances.
 4. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components for proper water management.
 5. Masonry Surfaces:
 - a. Masonry surfaces must be visibly dry and free of excess mortar, sand, and other construction debris.
 6. Wood Frame Walls:
 - a. Wood frame walls must be dry, clean, sound, well nailed, free of voids, and without offsets at joints.
 - b. Ensure that nail heads are driven flush with surfaces in opening and within 3" (76.2 mm) of opening.
 7. Metal Surfaces:
 - a. Metal surfaces must be dry and clean (free of grease, oil, dirt, rust, corrosion, and welding slag).
 - b. Ensure that metal surfaces are without sharp edges or offsets at joints.
- B. Proceed with installation only after correcting unsatisfactory conditions.

3.02 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum-framed storefront system, accessories, and other components.
- B. Install aluminum-framed storefront system so that components:
 1. Are level, plumb, square, and true to line.

2. Are without distortion and do not impede thermal movement.
 3. Are anchored securely in place to structural support.
 4. Are in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weather-tight construction.
- D. Install aluminum-framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within aluminum-framed storefront system to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.03 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjusting: Not applicable.
- B. Protection:
1. Protect installed product's finish surfaces from damage during construction.
- C. Cleaning:
1. Clean glass immediately after installation.
 - a. Comply with glass manufacturer's written recommendations for final cleaning and maintenance.
 - b. Remove non-permanent labels and clean surfaces.
 2. Clean aluminum surfaces.
 3. Avoid damaging protective coatings and finishes.
 4. Remove excess sealants, glazing materials, dirt, and other substances.
 5. Repair or replace damaged installed products.
 6. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during the construction period.
 7. Remove construction debris from project site and legally dispose of debris.

3.04 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with

AAMA 609 & 610.

3.05 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

DOOR HARDWARE

PART 1 - GENERAL

1.01 NOTIFICATIONS OF POTENTIAL HAZARDS

NOTIFICATION OF POTENTIAL HAZARDS: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.02 SUMMARY

Work under this section includes the door hardware requirements for the project. Hardware schedule is based on hollow metal doors and frames, and cabinet locks. Quantities listed are for the contractor's convenience and are not guaranteed. Items not specifically mentioned, but necessary to complete the work, shall be furnished, matching the items specified in quality and finish.

1.03 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section
- B. Related Sections
 - 1. Section 08 11 13 - Hollow Metal Doors and Frames

1.04 REFERENCES

- C. Reference Standards: Current edition at date of bid
- D. ANSI/BHMA A156.18 – Materials and Finishes
- E. ICC/ANSI A117.1 – Accessible and Usable Building and Facilities
- F. NFPA-80 Standard for Fire Doors and Window
- G. Underwriters Laboratories – Building Materials Directory
- H. Underwriters Laboratories Test Standard UL 10C-98 – Positive Pressure Fire Test of Door Assemblies.
- I. UL10C – Positive Pressure Fire Tests for Door Assemblies
- J. Architectural Door Hardware for Standard Steel Doors and Frames

1.05 SUBMITTALS

- K. General Requirements: All Submittals shall be in accordance with Section 01300 Submittals.
- L. Product Data: Submit and upload one(1) electronic copy of manufacturer's data for each item of door hardware to the ProCore\Submittals.
- M. Hardware Schedule: Submit six (6) copies of a detailed Door Hardware Schedule.
 - 1. Indicate complete designation of every item required for each door or opening.
 - 2. Furnish cover sheet listing title of project as shown on Contract Documents, name, address, phone and fax numbers of Owner, Architect,

- Contractor, and Supplier, name of Certified Hardware Consultant, and date of submittal.
3. List each opening individually under separate headings in same order as door schedule. Do not group like or similar doors under a single heading. Do not continue headings on separate pages.
 4. At each heading, indicate opening location, handing, degree of opening, door size, type, fire rating, and Door and Frame material.
 5. Indicate product manufacturer and incorporate cross-reference to symbols used in Hardware Schedule attached to this Section.
 6. Include locations for miscellaneous items.
 7. Cross reference abbreviations or symbols used.
 8. Index door number, heading, page number, and locking function of each opening.
 9. Schedules in coded or horizontal format are not accepted.
 10. Submittals not conforming to these requirements will be returned without review, for re- submittal. Following is an example of required format:

Exterior Single Door #100 – Exterior Door to Interior Corridor 2000 – RH 120 Degrees				
Number	Type	Model	Finish	Manufacture List
1	Lockset	98 EO	AL/626	VO
1	Cylinder	4040XP	AL	LCN
1	Door Closer/Hold Open	A5500	SS	ABH
1 Pair	Jamb Gaskets	2891 APK		PE
1	Head Gasket	2891 APK		PE
1	Door Sweep	315CN	AL	PE
1	Kickplate	K1050 B4ELTDW	630	RW
1	Threshold	WS437-150	626/US26D	GR

11. Processing: Hardware schedules will not be reviewed by Architect until they have been reviewed and approved by Contractor. Resubmit only corrected copies of those sheets requiring correction and update distributed copies with corrected sheets.
12. Modifications: Update Hardware Schedule and keep current throughout project duration.
13. Incorporate revisions conforming to specified requirements.
14. Submit only cover sheet and revised pages.
15. Clearly identify changes from previous submittal content.
16. Owner's Representative will review and approve final submittal. When approved, send one copy to Anchorage School District, Maintenance Department/Lock Shop, 1301 Labar Street, Anchorage Alaska 99515.
17. Review of hardware schedule does not relieve Contractor of responsibility to fulfill project requirements in accordance with the Contract Documents.
18. Affidavit of Coordination: Letter signed by an approved hardware consultant stating they have reviewed the drawings and specifications

and have coordinated the hardware for completeness, substrates, conditions of project. Submittals submitted without affidavit will be returned unreviewed.

19. Submit Certified Architectural Hardware Consultant qualifications and certificate.
- N. Operations and Maintenance Data:
20. Submittals: Submit Maintenance and Operations Manuals under provisions of Division 1, Operation and Maintenance Data.
 21. Content: Manuals shall contain final copy of Door Hardware Submittal, product data, templates, parts lists and diagrams, installation and maintenance instructions, wiring diagrams if any, and Product Warranties.

1.06 QUALITY CONTROL

- O. Quantities listed are for Contractor's convenience only and require verification. Provide Items not specifically mentioned, but necessary to complete work, matching items specified.
- P. Supplier:
1. Recognized builders' hardware supplier who has been furnishing hardware in same area as project for a period of not less than 5 years.
 2. Factory direct, authorized distributor of Exit Devices, Locksets, and Door Closers.
 3. Employing a hardware consultant, certified by Door and Hardware Institute (DHI), available during course of work to meet and consult with Owner, Architect, or Contractor.
- Q. Source: Furnish each kind of hardware from single source manufacturer, except as otherwise specified.
- R. Templates: Furnish hardware templates for each fabricator of doors, frames and other work to be factory prepared for installation of hardware. Upon request, check shop drawings of such other work to confirm that provisions will be made for proper installation of hardware.
- S. Installer:
4. Trained by hardware manufacturer or local trade union jurisdiction in procedures required for a successful installations, conforming to manufacturer's instructions.
 5. Able to document 3 years or more years' experience upon request by Owners representative.
- T. Codes and Standards:
6. All door hardware shall comply with current applicable local and/or state building codes.
 7. Hardware for fire-rated openings shall also be in compliance with all fire related building codes applicable to the district in which the building is located. Provide only hardware which has been tested and listed by UL for the types and sizes of doors required, and which complies with the requirements of the door and door frame label.

1.07 PRODUCT HANDLING

- U. Packaging:
1. Each item or package is to be separately tagged with identification related to final hardware schedule.
 2. Detailed installation instructions shall be included.
- V. Storage:
3. Provide locked room at the job site for storage of hardware.

1.08 WARRANTY

- W. Door hardware shall be warranted against defects in workmanship and operation for a period of one (1) year, backed by a factory warranty of the hardware manufacture. The following products shall be guaranteed for period beyond one (1) year:
1. Locks – 2 years
 2. Exit Devices – 5 years
 3. Door Closers – 10 years
 4. Electronics – 2 year

PART 2 - PRODUCTS

2.02 ABBREVIATIONS

A.	ABH	Architectural Builders Hardware
B.	ACSI	Architectural Control Systems, Inc.
C.	BE	Best Access Systems.(dormakaba Group)
D.	GR	Garadry
E.	LCN	LCN Door Closers (Allegion)
F.	LN	Locknetics
G.	MA	Marks
H.	MC	McKinney
I.	MK	Markar
J.	PE	Pemko Mfg
K.	RI	Rixson
L.	RW	Rockwood
M.	SC	Schlage
N.	ST	Stanley
O.	VO	Von Duprin

2.03 MANUFACTURES AND ACCEPTED SUBSTITUTIONS

- A. Manufacturers: Furnish products as specified or accepted substitutions as specified in table below:

Product	As Specified	Acceptable Substitutions
Butt Hinges	Mckinney	Stanley, Hager, Ives
Continuous Hinges	ABH 12 Gauge	Markar 12 Gauge
Cylinders & Cores	BEST	None
Locksets	Schlage L9000	None
Exit Devices	Von Duprin 98/99	None
Door Closers	LCN 4040XP Series	None
Flush Bolts/Surface Bolts	Rockwood	Ives / Glynn Johnson
Coordinators	Rockwood	Ives, Trimco
Kick Plates, Push/Pulls	Rockwood	Tice, Trimco, Ives
Wall and Floor Stops	Rockwood/ABH	Ives/ABH, Trimco/ABH
Holdings	ABH	Rixson, Glynn Johnson
Weatherstrip	Pemko	National Guard, Zero
Electrical Switches	ACSI	BEST, Schlage, Von Duprin
Threshold	Garadry	None

- B. Substitution Requests for Unlisted Products: Submit under provisions of Division 1

2.04 FINISH

- A. Finish in general to be US26D, except:

1. Where specifically noted differently.
2. Closers: SRI Prime/Al or powder coat
3. Exit Devices: US626 or US32D, satin stainless steel
4. Locksets: US626 or US32D, satin stainless steel
5. Thresholds: As listed in schedule

2.05 HARDWARE MATERIALS

- A. Fasteners: Provide fasteners for installation with each hardware item. Provide Phillips head fasteners, countersunk oval, flat head, or undercut head as appropriate for material to be installed.
- B. Compatibility: Provide fasteners that are compatible with both units fastened and substrate and that will not cause corrosion or deterioration of hardware, base material, or fastener.
- C. Door stops applied to masonry walls or concrete floors (avoid floor mount stop); provide double expansion shield type anchors. Sleeve anchors may be substituted when approved by owner for each location. .
- D. TEK/Self-Tapping screws are allowed for kickplates, push/pull, and weather stripping. All other uses are not permitted.

2.06 CONTINUOUS HINGES

- A. Design: 12-gauge stainless steel, Pin and Barrel.
- B. Provide Heavy Duty Stainless Steel continuous hinges prepped as needed by project requirements.

2.07 LOCKSETS (MORTISE)

- A. Types: Schlage L9000 Series are indicated under Hardware Schedule and as described below.
- B. Lever Design: Furnish Lever Handle Locksets and Latches in 06L Design.
- C. Ratings: Locksets and Latchsets shall be listed with Underwriters Laboratories for A label and lesser class doors.
- D. Provide extended spindles for doors with doors over 1-3/4" thick
- E. Strikes: Provide Curved Lip Strikes with adequate projection to protect door trim. Provide flat, flush lip strikes for pairs of doors with overlapping Astragals.
- F. Strike Boxes: Provide manufacturers standard wrought boxes

2.08 CYLINDERS RIM AND MORTISE

- A. Manufacturer: All lock cylinders shall be manufactured by BEST, no substitutions.
- B. Type that will accept "SFIC".

2.09 CORES

- A. Manufacturer listed: Best Access Systems, 7 pin, interchangeable core, "Premium". Provide typically with all locksets and as listed.
- B. Acceptable substitutions: None.

2.10 EXIT DEVICES

- A. Types: Von Duprin 98 Series are indicated under Hardware Groups and as described below. NOTE: VO 99 (grooved) is acceptable if VO99 hardware is on site to remain.
 1. All cylinder dogging shall accept BEST SFIC cylinders/cores.
- B. Pair Openings: Furnish two Exit Devices for pair openings.
- C. Rated Openings: Provide UL listed Fire Exit Hardware at rated openings.
- D. Sizes: Provide Exit Devices sized in accordance with manufacturer's recommendations.

- E. Vision Frames: Provide Glass Bead Kits where interference with vision frames occurs.
- F. Lever Trim: Exit Device Lever Trim shall be similar to design specified under LOCKSETS.
- G. Provide Sex Nuts and Bolts for all Exit Devices
- H. Mount 36 inches AFF to center of lever or pull at elementary schools, standard by DHI elsewhere.

2.11 DOOR CLOSERS, FURNISHING

- A. Types: LCN 4040XP Series are indicated under Hardware Groups and as described below.
- B. Pair Openings: Furnish two Door Closers for pair openings, except as noted in Hardware Groups.
- C. Drop Plates: Furnish drop plates where doors have insufficient height top rails, or where Regular Arm Door Closers are used in conjunction with Concealed Overhead Stops.
- D. Fluid: Furnish cold weather fluid at exterior & vestibule doors. Furnish non-flammable fluid at fire rated openings in conformance with UL Standard 10C.
- E. Spacer Blocks: Furnish Spacer Blocks where frame stop does not provide for adequate support for parallel arm soffit shoe.
- F. Special Mounting: Provide special closer mounting as required where interference with weatherstrip or sound seals occurs. Do not cut sound seal or weatherstrip to accommodate door closer shoe.
- G. Provide and/or mount all closers in parallel arm (EDA) configuration UON.
- H. Plastic covers are acceptable.

2.12 KICKPLATES, PUSH AND PULLS

- A. Fasteners: Provide stainless steel Phillips oval/undercut head, full tread type sheet metal screws for fastening not more than 5 inches on center.
- B. Material: Plates shall be .050 Stainless Steel and beveled 4 edges
- C. Provide kickplates 10" in height, typical height.
- D. Size: All plates shall be 2" less than door width on push side of door, except pairs of doors shall be 1-1/2" less than door width. All shall be 1-1/2" less than door width on pull side of door. Kick plates shall be 10" in height, standard.
- E. Mounting Height: Mount 1/2 inch from bottom of the door.

2.13 STOPS AND HOLDERS

- A. Only install door holders as indicated in the project documents.
- B. Pair Openings: Furnish two Stops for pair openings.
- C. Size: Furnish Overhead Stop and Holders sized as recommended by manufacturer
- D. Special Applications: Furnish Overhead Stop and Holders with special shims, brackets, or special template mounting where required
- E. Overhead stops may only be used where floor and wall stops won't work and must be approved for each location by the ASD Maintenance Lock Shop.
- F. Set doors to open 180 degrees and use floor or wall stops.

2.14 THRESHOLDS

- A. Types: As indicated in under Hardware Group and as described below.
- B. Fasteners: Furnish concrete anchor fastening system.

2.15 MISCELLANEOUS

- A. Types: As indicated under Hardware Group and as described below.
- B. Provide quantities of miscellaneous items as required for a complete and operational opening.

- C. Provide door silencers for all openings without gasketing/weatherstrip. Provide three (3) for single doors and four (4) for pairs of doors and doors 7'-6" and taller.

2.16 KEYING

- A. Types: A key conference will be conducted with the owner and hardware supplier to determine permanent keying requirements.
- B. Construction Keying: Provide Brass Construction Cores and Keys for all locks during construction period. Plastic Construction Cores are unacceptable. Construction cores shall remain the property of the hardware supplier and are to be returned after installation of permanent cores.
- C. All cylinders and locks are to be provided with brass BEST IC cores
- D. All keys and cores shall be provided to ASD Maintenance Lock Shop.
- E. Provide one (1) core per lock cylinder.
- F. Key Quantities: Provide three (3) uncut keys for each keyed lock cylinder.
- G. Ship all cores, keys, and label per project with quantity of each via registered mail, return receipt requested to: Anchorage School District, Maintenance Department / Lock Shop, 1301 Labar Street, Anchorage, Alaska 99515.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Examination: Examine Doors, Frames, and related items for conditions that would prevent proper application of Door Hardware. Do not proceed until defects are corrected
- B. Blocking: Provide solid blocking for Wall Stops, Automatic Operators, Wall Plate Actuators, and Magnetic Holders.
- C. Fasteners: Check conditions and use fastening devices as needed to securely anchor hardware as per manufacturer's published templates. Self-tapping sheet metal screws are not acceptable.

3.02 INSTALLATION

- A. Mounting Heights: Mount units at heights as recommended in Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames by Doors and Hardware Institute, except as indicated below. Products not specifically covered shall be installed in accordance with manufacturer templates and instructions.
- B. Continuous hinges: per manufacturer's installation instructions.
 - 1. Mortise Lock Strikes: 40 inches bottom of frame to centerline of strike.
 - 2. Exit Devices: Per manufacturer's recommendation.
- C. Installation: Install each hardware item in conformance to manufacturer's instructions..
 - 1. Cutting and Fitting: Wherever cutting and fitting are required to install hardware on surfaces that will be painted or finished at a later time, install each item completely and then remove and store in a secure place. After completion of finishes, re-install each item.
 - 2. Door and Frame Finishes: Do not install surface-mounted items until finishes have been completed on substrate.
 - 3. Fire Rated Openings: Install in accordance with NFPA 80
 - 4. Degree of Opening: Door shall swing to maximum degree that project conditions will allow. The swings indicated on floor plan are intended to depict direction and do not indicate full degree of opening.
 - 5. Exit Devices: Trim Exit Devices to provide 1-1/2 inch clearance between End Cap and hinge jamb stop face and stop applied weatherstrip.

6. Door Closers: Door Closer shall be located to allow maximum degree of opening that project conditions will allow. Door Closer shall not be used to stop door, except for models equipped with an integral stop-on--arm feature.
 7. Overhead Stops: Furnish Overhead Stop and Holders with maximum degree of opening that project conditions will allow. The use of overhead stops require approval of Owner.
 8. Floor Stops: Locate Floors Stops at maximum degree of opening that project conditions will allow. Do not locate Floor Stops where they create a hazardous condition. Stops should be located 6 inches away from the edge of the door.
 9. Thresholds: Set Exterior Thresholds in a bed of butyl rubber sealant. Completely fill all voids to exclude moisture. Remove excess sealant. Caulk edges and joints. Anchor Thresholds at Wood Gym Floors to Concrete side of opening only. Set threshold so the door sweep butts up against beveled or tapered edge of threshold.
 10. Weatherstrip: Mount and adjust Rigid Jamb Weatherstrip prior to mounting Parallel Arm Door Closers. Weatherstrip shall be installed to provide a continuous seal at head and jambs. Do not notch Weatherstrip for Door Closer shoe. Lower Door Closer Body 1/4 inch to allow for mounting of Soffit shoe on top of weatherstrip. Provide Parallel Arm 5th hole spacer of increased thickness to allow for revised location.
 11. Door sweeps to be installed on the exterior side of the door. Install additional screw(s) within 1 inch of the edges of door.
 12. Smoke Gasket: Completely clean frame and apply gasket in accordance with manufacturer's instructions. Mount Gasket to stop face of Strike Jambs and Headers, Door Rabbet of Hinge Jamb. If Gasket is required to be mounted on door rabbet of Strike Jambs due to Fire labeling requirements, provide Silencers.
- D. Adjustment: Adjust and check each operating item of hardware and each door to insure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly.

3.03 FINAL ADJUSTMENT

- A. Final Adjustment: Wherever hardware installation is made more than one (1) month prior to Substantial Completion, make a final check and adjustment of hardware items during week prior to Substantial Completion. Clean and lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- B. Door Closer Adjustment: After mechanical systems have been balanced, adjust Door Closers to conform to following ICC/ANSI A117.1 requirements.
 1. Closing Speed: With door open 70 degrees, door closer shall be adjusted so that door will take at least three (3) seconds to move to a point where leading edge of door is three inches from latching.
 2. Opening Force: The maximum force for pushing or pulling a door open shall be as follows: (these forces do not apply to force required to retract latch bolts or disengage other devices securing door).
 3. Fire Doors: The minimum opening force allowable by appropriate authority having jurisdiction.
 4. Exterior Doors: 8.5 lbf.
 5. Interior Doors: 5.0 lbf.
- C. Backcheck: Adjust to prevent damage to closer, hardware, door and frame, and wall.

- D. Instruction: Instruct Owner's Maintenance Personnel in proper adjustment and maintenance of hardware.

3.04 HARDWARE GROUP

HW SET: 01

Number	Type	Model	Finish	Manufacture List
1	Lockset	98 EO	AL/626	VO
1	Cylinder	4040XP	AL	LCN
1	Door Closer/Hold Open	A5500	SS	ABH
1 Pair	Jamb Gaskets	2891 APK		PE
1	Head Gasket	2891 APK		PE
1	Door Sweep	315CN	AL	PE
1	Kickplate	K1050 B4ELTDW	630	RW
1	Threshold	WS437-150	626/US26D	GR

END OF SECTION

GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glass.
- B. Glazing compounds and accessories.

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. NOTIFICATION OF POTENTIAL HAZARDS: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.04 RELATED REQUIREMENTS

- A. Section 08 43 13 Aluminum Framed Storefronts

1.05 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2011).
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2011.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- G. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2012a.
- H. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- I. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2009.
- J. GANA (SM) - GANA Sealant Manual; Glass Association of North America; 2008.
- K. ICC (IBC) - International Building Code; 2012.

1.06 SUBMITTALS

- A. See Section 01300 – Submittals for submittal procedures.
- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- D. Project Closeout: Complete ASD Window Information Form.

1.07 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual and GANA Sealant Manual for glazing installation methods.

1.08 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.

- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 WARRANTY

- A. See Section 01750 - Closeout Forms, for additional warranty requirements.

PART 2 PRODUCTS

2.01 GLAZING TYPES

- A. Type S-1 -Double Glazing:
 - 1. Applications: All exterior glazing unless otherwise indicated.
 - 2. Type: Tempered glass.
 - 3. Tint: Clear.
 - 4. Thickness: 1/4 inch. X 2 layers with 1/2" hermetically sealed air gap.

2.02 GLASS MATERIALS

- A. Float Glass: All glazing is to be float glass unless otherwise indicated.
 - 1. Annealed Type: ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).

2.03 GLAZING COMPOUNDS

- A. Manufacturers:
 - 1. Bostik Inc: www.bostik-us.com.
 - 2. Substitutions: Refer to Section 01630 - Product Requirements.
- B. Butyl Sealant: Single component; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; Shore A hardness of 10 to 20; black color; non-skinning.
- C. Acrylic Sealant: Single component, solvent curing, non-bleeding; ASTM C 920, Type S, Grade NS, Class 12-1/2, Uses M and A; cured Shore A hardness of 15 to 25; white.
- D. Polyurethane Sealant: Single component, chemical curing, non-staining, non-bleeding; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; Shore A Hardness Range 20 to 35; white.
- E. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; cured Shore A hardness of 15 to 25; clear.

2.04 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.
- D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option I; clear.
- E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.

- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.
- E. Install sealant in accordance with manufacturer's instructions.

3.03 GLAZING METHODS

3.04 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

- A. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

- A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- D. Place glazing tape on free perimeter of glazing in same manner described above.
- E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- F. Knife trim protruding tape.

3.06 CLEANING

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

3.07 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.01 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.02 SUMMARY

- A. This Section includes the following:
1. Performance criteria for gypsum board assemblies.
 2. Metal stud wall framing.
 3. Acoustic insulation.
 4. Gypsum wallboard.
 5. Joint treatment and accessories.
- B. Related Sections include the following:
2. Division 9 Section "Tiling".

1.03 REFERENCE STANDARDS

- A. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)
- B. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 2011.
- C. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2011.
- D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2002 (Reapproved 2007).
- E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2011a.
- F. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- G. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Product; 2011.
- H. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2011.
- I. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2011.
- J. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007.
- K. ASTM C1280 - Standard Specification for Application of Gypsum Sheathing; 2012.
- L. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2011.
- M. ASTM C1629/C1629 - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2006.
- N. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2012.

- O. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- P. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- Q. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- R. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2010.
- S. GA-600 - Fire Resistance Design Manual; Gypsum Association; 2009.
- T. ICC (IBC) - International Building Code; 2012.
- U. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

- A. Product Data
- B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.

PART 2 - PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
 - 1. See PART 3 for finishing requirements.
 - 3. Fire Rated Assemblies: Provide completed assemblies complying with applicable code.
 - a. ICC IBC Item Numbers: Comply with applicable requirements of ICC IBC for the particular assembly.
 - b. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
 - c. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory.

2.02 METAL FRAMING MATERIALS

- A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf (240 Pa).
 - 1. Studs: "C" shaped with flat or formed webs with knurled faces.
 - 2. Runners: U shaped, sized to match studs.
 - 3. Ceiling Channels: C shaped.
 - 4. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
 - 5. Resilient Furring Channels: 1/2 inch (12 mm) depth, for attachment to substrate through one leg only.
- B. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
- C. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and screwed to secondary deflection channel set inside but unattached to top track.

2.03 BOARD MATERIALS

- A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 - 2. Glass-mat-faced gypsum panels as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
 - 3. Thickness:
 - a. Vertical Surfaces: 5/8 inch (16 mm).
 - b. Ceilings: 5/8 inch (16 mm).

- D. Ceiling Board: Special sag-resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Ceilings.
 - 2. Thickness: 5/8 inch (16 mm).
 - 3. Edges: Tapered.

2.04 ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced.
- C. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
- D. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
- E. Screws for Attachment to Steel Members Less Than 0.03 inch (0.7 mm) In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.
- F. Screws for Attachment to Steel Members From 0.033 to 0.112 inch (0.8 to 2.8 mm) in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members at 16 inches (400 mm) on center.
 - 1. Level ceiling system to a tolerance of 1/1200.
 - 2. Laterally brace entire suspension system.
 - 3. Install bracing as required at exterior locations to resist wind uplift.
- C. Studs: Space studs as permitted by standard.
 - 1. Extend partition framing to structure where indicated and to ceiling in other locations.
 - 2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
 - 3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
- D. Standard Wall Furring: Install at concrete walls scheduled to receive gypsum board, not more than 4 inches (100 mm) from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches (600 mm) on center.
 - 1. Orientation: Horizontal.

3.03 BOARD INSTALLATION

- A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- C. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
 - 1. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistive barrier.
- D. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 - 1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.
 - 2. Corner Beads: Install at external corners, using longest practical lengths.

3.05 JOINT TREATMENT

- A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 2. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
 - 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 - 4. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
 - 5. Level 0: Temporary partitions and surfaces indicated to be finished in later stage of project.
- B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).
- C. Where Level 5 finish is indicated, spray apply high build drywall surface over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.
- D. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.07 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

END OF SECTION

TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tile for wall applications (TW-1, TW-2, TW-3).
- B. Cementitious backer board as tile substrate.
- C. Ceramic accessories.
- D. Ceramic trim.
- E. Non-ceramic trim.

1.02 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 REFERENCE STANDARDS

- A. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2013.1.
- B. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2013.1.
- C. ASTM C373 - Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products, Ceramic Tiles, and Glass Tiles; 2014a.
- D. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2015.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 01300 - Submittals, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, color arrangement, junctions with dissimilar materials, thresholds, ceramic accessories, and setting details.
- D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Tile: 5 percent of each size, color, and surface finish combination, but not less than one of each type.

1.06 QUALITY ASSURANCE

- A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- C. Installer Qualifications: Company specializing in performing tile installation, with minimum of five years of documented experience.

1.07 MOCK-UP

- A. See Section 01400 - Quality Control, for general requirements for mock-up.
- B. Construct tile mock-up where indicated by Owner, incorporating all components specified for the location.
 1. Minimum size of mock-up is 36 inch by 36 inch.
 2. Approved mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.00 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.01 TILE

- C. TW-1 Glazed Wall Tile,
 1. Moisture Absorption: 0.5 to 3.0 percent as tested in accordance with ASTM C373.
 2. Size: 4x12 inch, nominal.
 3. Thickness: 0.31 inch.
 4. Edges: Square.
 5. Surface Finish: Glazed plain satin.
 6. Color(s): White.
 7. Basis of Design: Mosa Global Collection
- D. TW-2 Glazed Wall Tile,
 1. Moisture Absorption: 0.5 to 3.0 percent as tested in accordance with ASTM C373.
 2. Size: 4x12 inch, nominal.
 3. Thickness: 0.31 inch.
 4. Edges: Square.
 5. Surface Finish: Glazed plain gloss.
 6. Color(s): Brilliant Blue.
 7. Basis of Design: Mosa Colors
- E. TW-3 Glazed Wall Tile,
 1. Moisture Absorption: 0.5 to 3.0 percent as tested in accordance with ASTM C373.
 2. Size: 4x12 inch, nominal.

3. Thickness: 0.31 inch.
4. Edges: Square.
5. Surface Finish: Glazed plain gloss.
6. Color(s): Accent Red.
7. Basis of Design: Mosa Global Collection

2.02 TRIM AND ACCESSORIES

- A. Ceramic Accessories: Glazed finish, same color and finish as adjacent field tile; same manufacturer as tile.
- B. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
 1. Manufacturers: Same as for tile.
- C. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
 1. Applications:
 - a. Open edges of wall tile.
 - b. Wall corners, outside and inside.
 - c. Thresholds at door openings.
 - d. Borders and other trim as indicated on drawings.
 2. Manufacturers:
 - a. Schluter-Systems: www.schluter.com.

2.03 SETTING MATERIALS

- A. Manufacturers:
 1. ARDEX Engineered Cements: www.ardexamericas.com.
 2. Bostik Inc www.bostik-us.com.
 3. LATICRETE International, Inc: www.laticrete.com.

2.04 GROUTS

- A. Epoxy
- B. Manufacturers:
 1. ARDEX Engineered Cements: www.ardexamericas.com.
 2. Bostik Inc: www.bostik-us.com.
 3. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com.

END OF SECTION

ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.02 SECTION INCLUDES

- A. Suspended metal grid ceiling system
- B. Acoustical units
- C. Ceiling Fascia Trim

1.03 RELATED REQUIREMENTS

- A. Division 21 – Fire Suppression Systems.
- B. Division 23 – HVAC / Mechanical.
- C. Division 26 – Electrical.

1.04 REFERENCE STANDARDS

- A. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2007.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2008.
- C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2011.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2008e1.
- E. GEI (SCH) - GREENGUARD "Children and Schools" Certified Products; GREENGUARD Environmental Institute; current listings at www.greenguard.org.
- F. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.06 SUBMITTALS

- A. See Section 01300 for submittal procedures.
- B. Product Data: Provide data including suspension system components.
- C. Samples: Submit two samples 4x4 inches illustrating material/finish of acoustical units, and 4 inches long of suspension system main runner.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.07 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART - 2 PRODUCTS

2.01 CEILING SYSTEM

- A. Manufacturers:
 - 1. Armstrong, www.armstrong.com
 - 2. Hunter Douglas Contract, www.hunterdouglascontract.com.
 - 3. USG, www.usg.com.
 - 4. Alternate Brand Request or Substitution Request required.
- B. Acoustical Units - General: ASTM E1264, Class A.
 - 1. Acoustical Tile: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
 - 2. VOC Content: Certified as Low Emission by one of the following:
 - a. GreenGuard Children and Schools; www.greenguard.org.
 - 3. Size: 24 inch by 48 inch or as required to match adjacent application.
 - 4. Thickness: 1 inch.
 - 5. Composition: Wet-formed mineral fiber.
 - 6. Light Reflectance: 0.90, determined as specified in ASTM E1264.
 - 7. NRC: 0.90-1.00, determined as specified in ASTM E1264.
 - 8. Articulation Class (AC): 190, determined as specified in ASTM E1264.
 - 9. Edge Profile: Square Lay-in 15/16, or as required to match adjacent application.
 - 10. Texture: Fine
 - 11. Surface Finish: DuraBrite with factory applied latex paint.
 - 12. Surface Color: White or as required to match adjacent application.

2.02 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
- B. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
 - 1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Postinstalled expansion anchors.
 - b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
 - 2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
 - 3. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.

4. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.135-inch- (3.5-mm-) diameter wire.
- E. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- F. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.
- G. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- H. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
- I. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in place.
- J. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches (610 mm) o.c. on all cross tees.
- K. Ceiling Fascia Trim. Where indicated in the drawings provide a factory fabricated metal fascia matching color and finish of the ceiling grid. Height as indicated on drawings. Basis of Design: Armstrong Axiom Transitions.

2.03 METAL SUSPENSION SYSTEM(S)

- A. Manufacturers:
 1. Armstrong, www.armstrong.com; BASIS OF DESIGN - "Prelude XL"
 2. Hunter Douglas Contract, www.hunterdouglascontract.com.
 3. USG, www.usg.com.
 4. Alternate Brand Request or Substitution Request required.
- B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation; with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges.
 1. Structural Classification: Heavy-duty system.
 2. End Condition of Cross Runners: Override (stepped) type.
 3. Face Design: Flat, flush.
 4. Cap Material: aluminum cold-rolled sheet.
 5. Cap Finish: as selected from manufacturer's full range.
- C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- B. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- C. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- F. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- G. Do not eccentrically load system or induce rotation of runners.
- H. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
 - 2. Overlap and rivet corners.

3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.

3.04 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

RESILIENT FLOORING

PART - 1 GENERAL

1.01 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.02 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Resilient base.
- C. Installation accessories.

1.03 RELATED REQUIREMENTS

- A. Division 9 Section "Gypsum Board Assemblies".

1.04 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- B. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2010)e1.
- C. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008 (Reapproved 2012).
- D. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing; 2004 (Reapproved 2010).
- E. GEI (SCH) - GREENGUARD "Children and Schools" Certified Products; GREENGUARD Environmental Institute; current listings at www.greenguard.org.
- F. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association; 2011.
- G. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute; October 2011.

1.05 SUBMITTALS

- A. See Section 01300 - Submittals, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01600 - Materials and Equipment for additional provisions

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect roll materials from damage by storing on end.

1.07 FIELD CONDITIONS

- A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.08 WARRANTY

- A. Correct defective Work within a ten-year period after Date of Substantial Completion.

PART 2 - PRODUCTS

2.01 RESILIENT TILE FLOORING

- A. Manufacturer: Acceptable Manufacturers are limited to the following:
 - 1. Armstrong World Industries: Basis of Design: Standard Excelon: www.armstrong.com.
 - 2. Mannington Mills Inc.: www.mannington.com.
 - 3. Altro: www.altro.com
 - 4. Gerflor USA; www.gerflor.com
 - 5. Alternate Brand Request or Substitution Request required.
- B. Luxury Vinyl Tile (LVT): Homogeneous, with color extending throughout thickness, and:
 - 1. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
 - 2. Size: 12" x 12".
 - 3. VOC Content: Certified as Low Emission by one of the following:
 - a. GreenGuard Children and Schools; www.greenguard.org.
 - 4. Overall Thickness: 0.125 inches (3.2 mm).
 - 5. Wear Layer Thickness: 0.020 inches (0.5 mm).
 - 6. Color/Pattern: As selected from manufacturer's full color line.

2.02 RESILIENT BASE

- A. Manufacturer: Acceptable Manufacturers are limited to the following:
 - 1. Armstrong World Industries: www.armstrong.com.
 - 2. Burke Flooring; www.burkemercer.com.
 - 3. Johnsonite, a Tarkett Company; www.johnsonite.com.
 - 4. Roppe Corp; www.roppe.com.
 - 5. Alternate Brand Request or Substitution Request required.
- B. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and as follows:
 - 1. Height: 4 inch.
 - 2. Thickness: 0.125 inch thick.
 - 3. Finish: Satin.
 - 4. Length: Roll.
 - 5. Color: Color as selected from manufacturer's standards.

2.03 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Moldings, Transition and Edge Strips: Same material as flooring.
 - 1. Product: Reducer Strip: Same material as resilient base.
 - 2. Product: Rubber Transition Strip: Same material as resilient base.
 - 3. Product: Anodized Aluminum Transition Ramp "RENO-RAMP/-K" manufactured by Schluter or approved product substitution
- C. Sealer and Wax: Types recommended by flooring manufacturer.

PART - 3 EXECUTION**3.01 EXAMINATION**

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
 - 1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings.
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- D. Prohibit traffic until filler is cured.
- E. Clean substrate.
- F. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- I. At movable partitions, install flooring under partitions without interrupting floor pattern.
- J. Install feature strips where indicated.

3.06 RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Install base on solid backing. Bond tightly to wall and floor surfaces.
- C. Scribe and fit to door frames and other interruptions.

3.07 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's instructions.

3.08 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.
- B. Apply manufacturers recommended floor sealer and buff out if recommended.

3.09 SCHEDULE

- A. Refer to Finish Schedule in Drawings.

END OF SECTION

FLUID APPLIED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. All floor and self covered wall base preparation. Special preparation of surfaces (including shot blasting, scarifying, and or etching) required to properly install products included in this specification.
- B. Fluid-applied flooring and base systems. Flooring and base system is to be installed prior to setting any floor mounted equipment or casework or fixtures to facilitate full coating system coverage of the designated spaces.
- C. Divider strips, coving backing and accessories.

1.02 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 RELATED WORK

- B. Section 07 90 00 - Joint Sealant: Bonding Compatibility with floor finish.
- C. Section 22 40 00 - Plumbing Fixtures: Recessed plumbing fixtures

1.04 REFERENCES

- A. ASTM D 570 - Standard Test Method for Water Absorption of Plastics; 1998.
- B. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics; 2002a.
- C. ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2002a.
- D. ASTM D 905 - Standard Test Method for Strength Properties of Adhesive Bonds in Shear by Compression Loading; 1998.
- E. ASTM D 4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser; 2001.
- F. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2001.
- G. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials; 2000.

1.05 SUBMITTALS

- A. Samples: Submit two samples, 6"x6" in size illustrating color and pattern for each floor material for each color specified.
- B. Manufacturer's Installation Instructions: Indicate special procedures.
- C. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.
- D. Product Data: Provide product data on all coating materials and accessories.
- E. Supervisor or Lead Installer letter of qualification.

1.06 QUALITY ASSURANCE

- A. Obtain all flooring and wall materials from a single manufacturer with a minimum of 5 years verifiable experience providing materials of the type specified in this section.
- B. The contractor shall furnish a list of projects using either specified material or equivalent that they have installed during the last three years. Information shall include project name, square footage, resumes detailing the experience of key personnel including supervisors and mechanics. The contractor shall be approved in writing by the material manufacturer for the system being installed.
- C. Supervisor Qualifications: Trained by product manufacturer, onsite supervisor or lead installer must have letter from manufacturer, to ensure manufacturer's certification.
- D. Floor System Thickness Verification: At the owner's discretion and under his supervision, the contractor shall take 4 – 1" random cores per 1,000 sq. ft. through the system into the substrate to verify proper system thickness. Cored areas less than specified thickness shall be removed and replaced or increased in thickness by the installing contractor, in a manner that does not affect the performance or integrity of the system. Cored areas, which comply with the recommended system thickness, shall be built up to match the surrounding surface elevation prior to applying the seal coat(s). Cores taken and patched will be noticeable; therefore, cores should be taken from areas where aesthetics are less critical.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store resin materials in a dry, secure area.
- B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Maintain minimum temperature in storage area of 55 degrees F (13 degrees C).
- B. Store materials in area of installation for minimum period of 24 hours prior to installation.
- C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.
- D. Relative Humidity Testing: Use In-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum **75** percent relative humidity level measurement or moisture/humidity

level maximum as required by Manufacturers available high moisture primer/sealant.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers are limited to the following:

1. BASIS OF DESIGN: Tennant Coatings -Epoxy Flake SR HTS: www.tennant.com
2. Dex-O-Tex: www.dexotex.com.
3. Dur-A-Flex: www.dur-a-flex.com.
4. Alternate Brand Request or Substitution Request required: Section 01 60 00.

2.02 MATERIALS

A. Fluid-Applied Flooring Type 1: epoxy, two component, trowel applied.

1. Basis of Design: Ceramic Carpet #554 Epo-Flex System by General Polymers.
2. Primer: As recommended by the manufacturer for the substrate conditions.
3. Base Coat: General Polymers Ceramic Carpet Minimum 1/8 inch (3 mm) thick; aggregate 3 color as selected.
4. Top Coat: General Polymers FasTop; 1/16 inch (1.5 mm) thick; clear.
5. Tensile Strength: 4,000 when tested in accordance with ASTM D 638.
6. Compressive Strength: 17,500 psi, when tested in accordance with ASTM D 695.
7. Water Absorption: <.04 percent, when tested in accordance with ASTM D 570 for 24 hrs.
8. Adhesion in Shear Strength: 500 psi minimum, when tested in accordance with ASTM D 905.
9. Abrasion Resistance: Maximum weight loss of 18mg/1000 cycles, when tested in accordance with ASTM D 4060.
10. Impact Resistance: 24,000 in/lb; no cracking, chipping or delamination, when tested with Gardner Impact Tester.
11. VOC Content:
 - a. VOC content of not more than 200 g/L.
12. Top Coat high resistance to ultraviolet deterioration of performance.
13. Mold & Mildew Resistance: No growth.
14. Color: High Reflective light colors, selected by Architect.

2.03 ACCESSORIES

- A. Divider Strips: Zinc, height to match flooring thickness, with anchoring features; silver color.
- B. Equipment sleeves: Zinc, height to match flooring thickness, with anchoring features; silver color. To protect anchoring mechanisms of existing floor mounted equipment and devices.
- C. Cant Strips: Fiberglass scrim and molded material compatible with flooring.
- D. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer for wet locations.
- E. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within tolerances specified in Greenhouse design requirements for no water ponding and are ready to receive flooring.
- B. Verify that sub-floor surfaces are dust-free, and free of substances which would impair bonding of materials to sub-floor surfaces.
- C. Verify that concrete sub-floor surfaces are ready for flooring installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
 - 1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft (7.1 kg per 100 sq m) per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
 - 2. Alkalinity: pH range of 5-9.

3.02 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler as recommended by FAP Manufacturer.
- B. Shot Blast / Scarify substrate.
- C. Key flooring depth at room perimeter per urethane flooring manufacturer's recommendation.
- D. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.
- E. Vacuum clean substrate.
- F. Apply primer to surfaces required by flooring manufacturer.

3.03 INSTALLATION - STRIPS

- A. Accurately saw cut substrate to install divider strips.
- B. Install strips straight and level to locations indicated.

- C. Install cant strips at base of walls where flooring is to be extended up wall as base.

3.04 INSTALLATION - FLOORING

- A. Apply in accordance with manufacturer's instructions.
- B. Apply each coat to minimum thickness indicated.
- C. Finish to smooth, non slip, level surface.
- D. Cove at vertical surfaces. Extend up 6 inches.

3.05 PROTECTION

- A. Prohibit traffic on floor finish for at least 48 hours after installation.
- B. Barricade area to protect flooring until cured.

END OF SECTION

PAINTING AND COATING

PART 1 - GENERAL

1.01 NOTIFICATIONS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.02 SECTION INCLUDES

- A. Surface preparation required to properly install products.
- B. Field application of paints and other coatings.
- C. Surfaces to be finished are indicated in this section and on the Drawings.

1.03 RELATED SECTIONS

- A. Division 9 Section Finishes
- B. Division 21 Section Fire Suppression

1.04 REFERENCES

- A. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Master Painters and Decorators Association; 2010.

1.05 SUBMITTALS

- A. Product Data: Provide complete list of all products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system (copy of relevant MPI Manual page is acceptable).
 - 4. If proposal of substitutions is allowed under submittal procedures, explanation of all substitutions proposed.
- B. Certification by manufacturer that products comply with Contract Documents and are compatible with applicable substrates and with each other.
- C. Samples for Verification: Submit three paper "drop" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, discuss sheen options with Prime Consultant before preparing samples, to eliminate sheens definitely not required.
 - 3. Paint color submittals will not be considered until color submittals for major materials not to be painted have been approved.
 - 4. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.06 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years experience.
- B. Maintain one copy of relevant portions of MPI Architectural Painting Specification Manual on project site at all times.

- C. Material Safety Data Sheets: At project site maintain file of MSDS sheets for each product used; become familiar with and follow manufacturer's stated application and safety requirements.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
- C. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

1.09 EXTRA MATERIALS

- A. Supply 1 gallon (4 L) of each color; new, unopened after mixing; store where directed.
- B. Label each container with color in addition to the manufacturer's label.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Provide all paint and coating products from the same manufacturer to the greatest extent possible.
- C. Acceptable Manufacturers are limited to the following:
 1. Sherwin Williams: www.sherwin-williams.com.
 2. Duron, Inc: www.duron.com.
 3. ICI Paints North America: www.icidecorativepaints.com.
 4. Benjamin Moore & Co: www.benjaminmoore.com.
 5. PPG Architectural Finishes, Inc: www.ppgaf.com.
 6. Glidden: www.glidden.com.
 7. Fuller-O'Brien: www.fullerpaint.com.
 8. Behr Process Corporation: www.behr.com.
 9. Alternate Brand Request or Substitution Request required.

2.02 MATERIALS

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
 3. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
 - a. Flat Paints and Coatings: 50 g/L.

- b. Nonflat Paints and Coatings: 150 g/L.
- c. Dry-Fog Coatings: 400 g/L.
- d. Primers, Sealers, and Undercoaters: 200 g/L.
- e. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
- f. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
- g. Pretreatment Wash Primers: 420 g/L.
- h. Shellacs, Clear: 730 g/L.
- i. Shellacs, Pigmented: 550 g/L.

- C. Patching Material: Latex filler.
- D. Fastener Head Cover Material: Latex filler.

2.03 PAINT SYSTEMS

- A. Provide Premium Grade systems (2 top coats) as defined in MPI Architectural Painting Specification Manual, except as otherwise indicated.
- B. Where a specified paint system does not have a Premium Grade, provide Custom Grade system.
- C. Where sheen is not specified or more than one sheen is specified, sheen will be selected later by Prime Consultant from the manufacturer's full line.
- D. Provide colors as scheduled on Drawings and Color Schedule.

2.04 INTERIOR PAINT SYSTEMS

- A. Structural Steel and Metal Fabrications:
 - 1. Applications include but are not limited to: columns, beams, joists, exposed fire sprinkler piping, etc.
 - 2. Water-Based Light Industrial Coating System [MPI INT 5.1B]:
 - a. 1st Coat: Primer, rust-inhibitive, water based [MPI #107].
 - b. 2nd Coat: Light industrial intermediate coating, interior, water based, matching topcoat.
 - c. 3rd Coat: Light industrial top-coating, interior, water based, semi-gloss (MPI Gloss Level 5) [MPI #153].
- B. Angle Iron Base of Wall Supports:
 - 1. Applications includes: angle iron supports used to seismically secure the base of masonry walls. See Detail 2 on Drawing S1.01 and Drawings A1.02 and A1.03 for extents.
 - 2. Polyurethane, Pigmented (over epoxy primer) Coating System [MPI INT 5.1F]:
 - a. 1st Coat: Primer, epoxy [MPI #101].
 - b. 2nd Coat: Polyurethane [MPI #72].
 - c. 3rd Coat: Polyurethane, semi-gloss [MPI #72].
- C. Steel Subject to High Temperatures:
 - 1. Applications include but are not limited to: boilers, furnaces, stacks, piping, etc.
 - 2. Heat Resistant Enamel (Maximum 400° F) [MPI INT 5.2A]:
 - a. Apply in strict accordance with Manufacturer's Instructions (MPI Gloss Level 6) [MPI #21].
- D. Galvanized Metal, Not Chromate Passivated:
 - 1. Applications include but are not limited to: doors, frames, railings, piping, etc.
 - 2. Alkyd over water-based galvanized primer [MPI INT 5.3L]:
 - a. 1st Coat - Water Based Galvanized Primer [MPI #134]
 - b. 2nd Coat - Alkyd [MPI #48]
 - c. 3rd Coat - Alkyd (MPI Gloss Level 5) [MPI #48]
- E. Woodwork:
 - 1. Applications include but are not limited to doors, door frames, window frames, window casings, trim, baseboards, and moldings.
 - 2. High Performance Architectural Latex (MPI INT 6.3A):
 - a. 1st Coat - Latex Primer Sealer MPI #50

- b. 2nd Coat - HIPAC Latex (MPI Gloss Level 3) [MPI #139]
- c. 3rd Coat - HIPAC Latex (MPI Gloss Level 3) [MPI #139]

F. Gypsum Board:

- 1. Applications include but are not limited to walls, ceilings, soffits, and bulkheads.
- 2. High Performance Architectural Latex [MPI INT 9.2B]:
 - a. 1st Coat - Latex Primer Sealer [MPI #50]
 - b. 2nd Coat - HIPAC Latex (MPI Gloss Level 3) [MPI #139]
 - c. 3rd Coat - HIPAC Latex (MPI Gloss Level 3) [MPI #139]

2.05 EXTERIOR PAINT SYSTEMS

A. Structural Steel and Metal Fabrications:

- 1. Applications include but are not limited to: piling (to 1' below finish grade), columns, beams, joists, doors, etc.
- 2. Alkyd System [MPI EXT 5.1D]:
 - a. 1st Coat: Alkyd Primer, anticorrosive for metal [MPI #79].
 - b. 2nd Coat: Alkyd, exterior enamel intermediate coat matching topcoat.
 - c. 3rd Coat: Alkyd, exterior enamel topcoat (Gloss Level 5), [MPI #94].

B. Steel Subject to High Temperatures:

- 1. Applications include but are not limited to: boilers, furnaces, stacks, piping, etc.
- 2. Heat Resistant Enamel (Maximum 400° F) [MPI EXT 5.2A]:
 - a. Apply in strict accordance with Manufacturer's Instructions (MPI Gloss Level 6) [MPI #21].

C. Galvanized Metal, Not Chromate Passivated:

- 1. Applications include but are not limited to: doors, frames, railings, piping, mechanical sheet metal, etc.
- 2. Alkyd over water-based primer [MPI EXT 5.3N]:
 - a. 1st Coat - Water Based Galvanized Primer [MPI #134]
 - b. 2nd Coat - Alkyd [MPI #9]
 - c. 3rd Coat - Alkyd (MPI Gloss Level 5) [MPI #9]

PART 3 - EXECUTION

3.01 SCOPE -- SURFACES TO BE FINISHED

- A. Paint all exposed surfaces except where indicated not to be painted or to remain natural; the term "exposed" includes areas visible through permanent and built-in fixtures when they are in place.
- B. Paint the surfaces described in PART 2, indicated on the Drawings, and as follows:
 - 1. If a surface, material, or item is not specifically mentioned, paint in the same manner as similar surfaces, materials, or items, regardless of whether colors are indicated or not.
 - 2. Paint surfaces behind movable equipment and furnishings the same as similar exposed surfaces.
 - 3. Paint surfaces to be concealed behind permanently installed fixtures, equipment, and furnishings, using primer only, prior to installation of the permanent item.
 - 4. Paint back sides of access panels and removable and hinged covers to match exposed surfaces.
 - 5. Finish top, bottom, and side edges of exterior doors the same as exposed faces.
 - 6. Paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, and hangers, brackets, collars and supports occurring in finished areas to match background surfaces, unless otherwise indicated.
 - 7. Paint shop-primed mechanical and electrical items occurring in finished areas.
 - 8. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- C. Do Not Paint or Finish the Following Items:

1. Items fully factory-finished unless specifically noted; factory-primed items are not considered factory-finished.
2. Items indicated to receive other finish.
3. Items indicated to remain naturally finished.
4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
5. Anodized aluminum.
6. Polished and brushed stainless steel items.
7. Concrete masonry in utility, mechanical, and electrical spaces.
8. Acoustical materials.
9. Concealed piping, ductwork, and conduit.

3.02 EXAMINATION

- A. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials; report incompatible primer conditions and submit recommended changes for Prime Consultant's approval.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 1. Concrete: 12 percent.
 2. Fiber-Cement Board: 12 percent.
 3. Masonry (Clay and CMUs): 12 percent.
 4. Wood: 15 percent.
 5. Gypsum Board: 12 percent.
 6. Plaster: 12 percent.
- E. Measure the pH factor of concrete, masonry, and mortar before starting any finishing process, using the method specified in MPI Architectural Painting Manual.
 1. Report results in writing to Owner before starting work.
 2. If results of test indicate need for remedial action, provide written description of remedial action. If a different primer or paint systems is required, state the total cost of the change. Do not proceed with remedial action or change without receiving written authorization from Owner.

3.03 PREPARATION

- A. Prepare surfaces as specified in MPI Architectural Painting Specification Manual and as follows for the applicable surface and coating; if multiple preparation treatments are specified, use as many as necessary for best results; where the Manual references external standards for preparation (e.g. SSPC standards), prepare as specified in those standards; comply with coating manufacturer's specific preparation methods or treatments, if any.
- B. Coordinate painting work with cleaning and preparation work so that dust and other contaminants do not fall on newly painted, wet surfaces.
- C. Surface Appurtenances: Prior to preparing surfaces or finishing, remove electrical plates, hardware, light fixtures, light fixture trim, escutcheons, machined surfaces, fittings, and similar items already installed that are not to be painted.
 1. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before preparation and finishing.
 2. After completing painting in each space or area, reinstall items removed using workers skilled in the trades involved.
- D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
- E. Marks: Seal with shellac those which may bleed through surface finishes.

- F. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Insulated Coverings to be Painted: Remove dirt, grease, and oil from canvas.
- I. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- J. Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
- K. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- L. Wood Items to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- M. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.04 APPLICATION

- A. Apply products in accordance with manufacturer's instructions and as specified or recommended by MPI Manual, using the preparation, products, sheens, textures, and colors as indicated.
 - 1. Remove, refinish, or repaint work not complying with requirements.
- B. Do not apply finishes over dirt, rust, scale, grease, moisture, scuffed surfaces, or other conditions detrimental to formation of a durable coating film; do not apply finishes to surfaces that are not dry.
- C. Use applicators and methods best suited for substrate and type of material being applied and according to manufacturer's instructions.
 - 1. Brush Application: Use brushes best suited for the type of material applied; use brush of appropriate size for the surface or item being painted; produce results free of visible brush marks.
 - 2. Roller Application: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 - 3. Spray Application: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
 - 4. Where application method is listed in the MPI Manual for the paint system that application method is required; otherwise any application method recommended by manufacturer for material used and objects to be painted is acceptable.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate; provide total dry film thickness of entire system as recommended by manufacturer.
 - 1. Number of coats and film thickness required are the same regardless of application method.
 - 2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance.
 - 3. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent to that of flat surfaces.
- E. Apply finish to completely cover surfaces with uniform appearance without brush marks, runs, sags, laps, ropiness, holidays, spotting, cloudiness, or other surface imperfections.
 - 1. Before applying finish coats, apply a prime coat of material recommended by manufacturer, unless the surface has been prime coated by others; where evidence of suction spots or

unsealed areas in first coat appear, recoat primed and sealed surfaces to ensure finish coat with no burn through or other defects due to insufficient sealing.

2. Apply first coat to surface that has been cleaned, pretreated, or otherwise prepared as soon as practical after preparation and before subsequent surface deterioration.
3. Do not apply succeeding coats until the previous coat has cured as recommended by manufacturer.
4. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat will not cause the undercoat to lift or lose adhesion.
5. If manufacturer's instructions recommend sanding to produce a smooth, even surface, sand between coats.
6. Before applying next coat vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

3.05 CLEANING AND PROTECTION

- A. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from site.
- C. Protect other work, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting as approved by Prime Consultant.
- D. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in MPI Manual.

3.06 SCHEDULE - COLORS

- A. See Plans and Schedules for extent of surfaces to be painted.

END OF SECTION

PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Solid-plastic toilet compartments configured as toilet enclosures.
- B. Related Requirements:
 - 1. Section 10 28 00 "Toilet and Bath Accessories" for toilet tissue dispensers, grab bars, and similar accessories mounted on toilet compartments.

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.
- B. Shop Drawings: For toilet compartments.
 - 1. Include plans, elevations, sections, details, and attachment details.
 - 2. Show locations of cutouts for compartment-mounted toilet accessories.
 - 3. Show locations of centerlines of toilet fixtures.
 - 4. Show locations of floor drains.
- C. Samples for Initial Selection: For each type of toilet compartment material indicated.
 - 1. Include Samples of hardware and accessories involving material and color selection.
- D. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

1.05 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of toilet compartment.

1.06 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: 25 or less.
 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in and ICC A117.1 for toilet compartments designated as accessible.

2.02 SOLID-PLASTIC TOILET COMPARTMENTS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. Bradley Corporation.
 2. Accurate Partitions Corp.; ASI Group.
 3. AJW Architectural Products.
 4. All American Metal Corp.
 5. American Sanitary Partition Corporation.
 6. Ampco Products, LLC.
 7. Bradley Corporation.
 8. Global Partitions; ASI Group.
 9. Knickerbocker Partition Corporation.
 10. Marlite.
 11. Scranton Products.
 12. Weis-Robart Partitions, Inc.
- B. Toilet-Enclosure Style: Floor and wall anchored.
- C. Entrance-Screen Style: Overhead braced Floor anchored.
- D. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch (25 mm) thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.

1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
 2. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum or stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
 3. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range.
- E. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; polymer or stainless steel.
1. Polymer Color and Pattern: Matching pilaster.
- F. Brackets (Fittings):
1. Stirrup Type: Ear or U-brackets, chrome-plated zamac clear-anodized aluminum stainless steel chrome-plated brass.
 2. Full-Height (Continuous) Type: Manufacturer's standard design; polymer or extruded aluminum.
 - a. Polymer Color and Pattern: Matching panel.

2.03 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's heavy-duty operating hardware and accessories.
1. Hinges: Manufacturer's minimum 0.062-inch- (1.59-mm-) thick stainless-steel continuous, cam type that swings to a closed or partially open position, allowing emergency access by lifting door. Mount with through-bolts.
 2. Latch and Keeper: Manufacturer's heavy-duty surface-mounted cast-stainless-steel latch unit designed to resist damage due to slamming, with combination rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible. Mount with through-bolts.
 3. Coat Hook: Manufacturer's heavy-duty combination cast-stainless-steel hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories. Mount with through-bolts.
 4. Door Bumper: Manufacturer's heavy-duty rubber-tipped cast-stainless-steel bumper at out-swinging doors. Mount with through-bolts.
 5. Door Pull: Manufacturer's heavy-duty cast-stainless-steel pull at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible. Mount with through-bolts.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.04 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M).
- C. Brass Castings: ASTM B 584.

- D. Brass Extrusions: ASTM B 455.
- E. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- F. Stainless-Steel Castings: ASTM A 743/A 743M.
- G. Zamac: ASTM B 86, commercial zinc-alloy die castings.

2.05 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- D. Floor-and-Ceiling-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.
- E. Door Size and Swings: Unless otherwise indicated, provide 24-inch- (610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging doors with a minimum 32-inch- (813-mm-) wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
 - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - 1. Maximum Clearances:
 - a. Pilasters and Panels: 1/2 inch (13 mm).
 - b. Panels and Walls: 1 inch (25 mm).
 - 2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel.

- a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- 3. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches (44 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches (51 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.
- D. Floor-and-Ceiling-Anchored Units: Secure pilasters to supporting construction and level, plumb, and tighten. Hang doors and adjust so doors are level and aligned with panels when doors are in closed position.

3.03 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.
- B.

END OF SECTION

WALL PROTECTION PANELS

PART 1 GENERAL

1.01 SUMMARY

A. SECTION INCLUDES

1. Wall Protection Systems:
 - a. Semi-Rigid Protective Wallcoverings.

B. Related Sections/Items:

1. Wood blocking and grounds, refer to Section 06 10 00.
2. Stainless steel mop plates, kick plates, and armor plates, refer to Section 08 71 00.

1.02 SUBMITTALS

- A. Comply with Section 01300.
- B. Product data indicating compliance with specified requirements.
- C. Shop drawings showing methods of attachment to substrate.
- D. Samples: For selection of color, pattern, and surface texture.
 1. 7 x 9 inch (175 x 225 mm) samples of each rigid sheet or panel type wall surface protection material required.

1.03 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Comply with ASTM E 84 for the fire performance characteristics indicated below. Identify components with markings from testing and inspection organization.
 1. Flame Spread: 25 or less.
 2. Smoke Developed: 450 or less.
- B. Single Source Responsibility: Obtain wall surface protection system components from a single source.
- C. Deliver materials in original factory wrappings and containers, clearly labeled with manufacturer and brand name.
- D. Store materials in original undamaged packages and containers inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 1. Maintain room temperature within the storage area between 60° F (16° C) and 80° F (27° C) during the period plastic materials are stored. Keep materials out of direct sunlight to avoid excessive surface temperatures.

2. Store rigid plastic in a horizontal position for a minimum of 72 hours, or until the plastic material attains the ambient room installation temperature of between 65° F (18° C) and 75° F (24° C).

1.04 PROJECT CONDITIONS

- A. Maintain ambient temperature within building at not less than 65° F (18° C) or greater than 75° F (24° C) for a minimum 72 hours prior to beginning of installation.
- B. Do not install wall surface protection system components until the space is enclosed, weather proof and climate controlled.
- C. Do not install semi-rigid wall protection systems until temperature is stable and permanent lighting is in place.

1.05 MAINTENANCE

- A. Maintenance Instructions: Include precautions against cleaning materials and methods that may be detrimental to finishes and performance.
- B. Replacement Materials: Minimum 2% of each type, color, and pattern of wall surface protection materials and components. Include accessory components as required. Replacement materials shall be from the same production run as installed materials. Package with protective coverings and appropriate labels.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Koroseal Wall Protection Systems
- B. Approved Equals

2.02 MATERIALS

- A. Plastic Sheet Wallcovering Material: Textured, chemical-and stain-resistant, high-impact, acrylic modified vinyl plastic sheets, thickness as indicated. Comply with specified requirements of ASTM D 256 for impact resistance and ASTM E 84 for flame spread and smoke developed characteristics.
- B. Color and/or Pattern: As selected by Architect from the manufacturer's full range of standard colors and textures.

2.03 IMPACT-RESISTANT WALL COVERINGS

- A. Semi-rigid, Integrally Colored Sheet Wallcovering: Semi-rigid, embossed, impact-resistant plastic sheets or roll stock. Comply with fire performance characteristics specified and be chemical-and stain-resistant.
 1. Solid colors.
 - a. Sheet Thickness: 0.060 inch (1.5 mm) thick, Class I/A Fire-Rated.
 2. Color: As selected.

- B. Color Matched Caulk: Manufacturer's standard.
- C. Adhesive and Primer: As recommended by manufacturer.

2.04 FABRICATION

- A. Comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thicknesses of components.
- B. Shop-assemble components to the greatest extent possible. Disassemble only as necessary for shipping and handling.
- C. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of evidence of wrinkling, chipping, uneven coloration, dents, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.
- D. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors for interconnection of members to other construction.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions in which wall surface protection components and wall protection systems will be installed.
- B. Complete finishing operations, including painting, before beginning installation of wall surface protection system materials.
- C. Wall surfaces to receive impact-resistant wall covering materials shall be dry and free from dirt, grease, loose paint, and scale.
- D. Do not proceed with installations until unsatisfactory conditions have been corrected.

3.02 PREPARTION

- A. Properly prepare substrate and clean to remove dust, debris, and loose particles.

3.03 INSTALLATION

- A. Install wall surface protection units plumb, level, and true to line without distortions.
- B. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished work.
- C. Install aluminum retainers, mounting brackets, and other accessories in strict accordance with the manufacturer's instructions.
- D. Where splices occur in horizontal runs of over 20 feet (6 m), splice aluminum retainer and plastic cover at same locations along the run.

3.04 CLEANING

WALL PROTECTION PANELS

Division 10

Section 10 26 00

- A. Clean plastic covers and accessories using a standard non-ammonia-based household cleaning agent.
- B. Remove excess adhesive in manner recommended by manufacturer.

END OF SECTION

CORNER GUARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Corner guards and substrate cushion material.

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Blocking for anchors for corner guards.

1.04 REFERENCE STANDARDS

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2013a.

1.05 SUBMITTALS

- A. See Section 01300 - Submittals, for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, anchorage details, and rough-in measurements.
- C. Samples: Submit two sections of corner guard, 6 inch long, illustrating component design, configuration, color and finish.
- D. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 COMPONENTS

- A. Corner Guards - Surface Mounted: Stainless Steel Corner Guards: 3.5" x3.5" -1/8" radius corner, 18 gauge, type 304 with satin finish and 10 degree tapered vertical edge. All edges eased and deburred.
 - 1. Extent of Work:
 - a. Provide at all new interior outside corners of non-masonry walls.
 - 2. Type of application: extend from 4 inches AFF to 84" AFF. Guard to be continuous, no intermediate joints permitted.
- B. Mounting Brackets and Attachment Hardware: Appropriate to component and substrate.

2.02 FABRICATION

- A. Pre-drill holes for mechanical attachment.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- B. Verify that field measurements are as indicated on Drawings.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.
- B. Position corner guard 4 inches above finished floor to 84 inches high.

3.03 TOLERANCES

- A. Maximum Variation from Required Height: 1/4 inch.
- B. Maximum Variation from Level or Plane for Visible Length: 1/4 inch.

END OF SECTION

TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Public-use washroom accessories.

1.02 NOTIFICATION OF POTENTIAL HAZARDS:

- A. Notification of Potential Hazards: Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.04 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.05 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Include electrical characteristics.
- B. Samples: Full size, for each exposed product and for each finish specified.
 - 1. Approved full-size Samples will be returned and may be used in the Work.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify accessories using designations indicated.

1.06 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

1.07 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

1.08 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, visible silver spoilage defects.
 - 2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 OWNER-FURNISHED MATERIALS

- A. Owner-Furnished Contractor Installed Materials:
 - 1. Paper Towel Dispenser – PTD
 - 2. Toilet Paper Dispenser – TPD
 - 3. Soap Dispenser - SD

2.02 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.03 TOILET ROOM ACCESSORIES

- A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.
- B. Mirror Unit:
 - 1. Frame: Stainless-steel channel Stainless steel.
 - a. Corners: Welded and ground smooth.
 - 2. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
 - a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
 - b. Wall bracket of galvanized steel equipped with concealed locking devices requiring a special tool to remove.
 - 3. Size: As indicated on Drawings.
- C. Grab Bars (ADA Toilet Stalls, ADA Shower Stalls):
 - 1. Description: ADA compliant tubular heavy gauge with radiused returns anti-theft fasteners and trim covers. See drawings for lengths and profiles.
 - 2. Material and Finish: Stainless steel, No. 4 finish (satin).

2.04 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.05 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Provide support blocking for Owner Furnished Contractor Installed Accessories in addition to blocking for items specified in this section.
- C. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

3.02 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION

MECHANICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Supplemental requirements in addition to Division 1 - General Requirements applicable to all Divisions 20, 21, 22, 23 - Mechanical specification sections.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 20 05 05 - Mechanical Demolition
 - 3. 20 05 29 - Mechanical Hangers and Supports
 - 4. 20 05 48 - Mechanical Vibration and Seismic Control
 - 5. 20 05 53 - Mechanical Identification
 - 6. 20 07 00 - Mechanical Insulation
 - 7. 21 10 00 - Water Based Fire Suppression Systems
 - 8. 22 11 00 - Domestic Water Piping and Specialties
 - 9. 22 13 00 - Sanitary Waste and Vent Piping and Specialties
 - 10. 22 14 00 - Storm Drainage Piping and Specialties
 - 11. 22 40 00 - Plumbing Fixtures
 - 12. 23 05 93 - Testing, Adjusting, and Balancing
 - 13. 23 21 13 - Hydronic Piping and Specialties
 - 14. 23 31 00 - Ducts and Accessories
 - 15. 23 37 00 - Air Outlets and Inlets
 - 16. 23 82 00 - Terminal Heating and Cooling Units

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Codes and Standards:
 - 1. Perform work in accordance with the legally enacted editions of applicable international, state and local codes with locally accepted amendments to include:
 - a. 2018 International Building Code (IBC).
 - b. 2018 International Mechanical Code (IMC).
 - c. 2018 International Fuel Gas Code (IFGC).
 - d. 2018 Uniform Plumbing Code (UPC).

- e. 2018 International Fire Code (IFC).
 - f. 2017 NFPA 70, National Electric Code (NEC).
 - g. ASCE 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
 - h. Standard for Accessible and Usable Buildings and Facilities (ANSI A117.1-2017).
2. Standards: Reference to the following standards infers that installation, equipment and material shall be within the limits for which it was designed, tested and approved, in conformance with the current publications and standards of the following organizations:
- a. American National Standards Institute - ANSI.
 - b. American Society of Heating Refrigerating and Air Conditioning Engineers - ASHRAE.
 - c. American Society of Mechanical Engineers - ASME.
 - d. American Society for Testing and Materials - ASTM.
 - e. National Electrical Manufacturers' Association - NEMA.
 - f. National Fire Protection Association - NFPA.
 - g. Sheet Metal and Air Conditioning Contractors National Association, Inc. - SMACNA.
- B. Definitions:
- 1. "Accessible" means arranged so that an appropriately dressed person 6'-2" tall, weighing 250 pounds, may approach the area in question with the tools and products necessary for the work intended; and may then position himself to properly perform the task to be accomplished, without disassembly or damage to the surrounding installation.
 - 2. "Authority Having Jurisdiction" is the individual official, board, department, or agency established and authorized by the political subdivision created by law to administer and enforce the provisions of the Code as adopted or amended.
 - 3. "As Specified" denotes a product, system, or installation that:
 - a. Includes salient characteristics identified in the Drawings and Specifications.
 - b. Meets the requirements of the "Basis of Design".
 - c. Is produced by a manufacturer listed as acceptable on the Drawings or in the Specifications.
 - 4. "Basis of Design" refers to products around which the design was prepared. Some or all of the particular characteristics of Basis of Design products may be critical to the fit or performance of the completed installation. Such characteristics are often subtle. Where substitutions are made to products that are the Basis of Design, the Contractor is alerted that nominally acceptable substitutions may produce undesirable side effects such as products that no longer fit the space due to increased product dimensions. The Contractor is responsible for resolving impacts of substitutions. Approval of a substitution request does not relieve the Contractor of complying with the design intent and applicable Codes. Reference to a specific manufacturer's product (even as "Basis of Design") does not necessarily establish acceptability of that product without regard to compliance with other provisions of these specifications.
 - 5. "Contracting Agency" is the Owner as defined in the General Conditions of the Contract.
 - 6. "Demolish" means to permanently remove a component, equipment, or system and its appurtenances with no intent for reuse and to properly disposal of it.
 - 7. "Furnish" means to purchase material as shown and specified and cart the material to an approved location at the site or elsewhere, as noted or agreed, to be installed by supporting crafts.
 - 8. "Install" means to set in place and connect, ready for use and in complete and properly operating finished condition, material that has been furnished.
 - 9. "Product" is a generic term that includes materials, equipment, fixtures, and any physical item used on the project.
 - 10. "Provide" means furnish products, labor, subcontracts, and appurtenances required and install to a complete and properly operating, finished condition.
 - 11. "Remove" means to remove a component, equipment, or system and its appurtenances

- and either store it for re-installation/reuse, or turn it over to the Contracting Agency.
12. "Replace" means to provide a new component, equipment, or system in place of an existing component, equipment, or system that has been removed.
 13. "Rough-in and Connect" means provide an appropriate system connection such as water services with stops, continuous wastes with traps, shutoff valves, and piping connections, testing, etc., for proper operation, ready for furnished products to be installed. Equipment furnished is received, uncrated, assembled and set in place by supporting crafts unless prior arrangements are made to hire the rough-in installer for this work.
 14. "Serviceable" means arranged so that the component or product in question may be properly removed and replaced without disassembly, destruction or damage to the surrounding installation. "Serviceable" components shall be "accessible".
 15. "Shop Drawings" are dimensioned working construction drawings drawn to scale to show an entire area of work in sufficient detail to demonstrate service and maintenance clearances and coordination of all trades.
 16. "Substitution" is a product, system or installation that is not by a listed manufacturer or does not conform to all salient characteristics identified in the Project Manual, but that the Contractor warrants meets specific requirements listed in the Project Manual.
 17. "System Drawing" is a diagrammatic engineered drawing that shows the interconnection and relationship between products to demonstrate how the products interact to accomplish the function intended. Examples of system drawings include plumbing diagrams, control and instrumentation diagrams, and wiring diagrams. Some drawings, such as dimensioned and complete Fire Suppression Drawings may be both System Drawings and Shop Drawings.

1.05 SYSTEM DESCRIPTION

A. Performance Requirements:

1. Provide labor, products and services required for the complete installation, checkout, and startup of mechanical systems shown and specified. Coordinate related work, including the work of other crafts, to provide each system complete and in proper operating order.
2. Cooperate with others involved in the project; with due regard to their work, to promote rapid completion of the entire project.
3. Become thoroughly familiar with the local conditions under which the work is to be performed. Schedule work with regard to seasons, weather, climatic conditions, and other local conditions that may affect the progress and quality of the work.
4. Coordinate and perform demolition in support of the project whether or not such requirements are described on the Drawings. Restore systems that are to remain but that are affected in any way by demolition work. Conduct a site visit prior to bid to determine Scope.
5. In general, the mechanical, electrical and building automation systems are interrelated. Coordinate the interface and operation of systems so that interrelated systems operate in proper synchronization and balance.
6. Provide labor, materials, and equipment to facilitate the commissioning process of systems and equipment within this scope of work. Perform tests and verification procedures required for the commissioning process as requested by the Contracting Agency.
7. Work and materials shall be in accordance with requirements of the applicable State and local Codes, regulations and ordinances, and the rules and regulations of other Authorities Having Jurisdiction. Nothing in drawings and specifications shall be construed to permit work not in conformance with applicable codes, rules, and regulations.
8. Where drawings or specifications call for a material or construction of a better quality or larger sizes than required by the above-mentioned Codes, rules and regulations, the provision of the specifications shall take precedence.
9. Furnish without any extra charge any additional material and labor when required for

compliance with the listed codes, rules and regulations, even though the work may not be mentioned in the specifications or shown on the drawings. It is the responsibility of the successful bidder to bid in accordance with the minimum requirements of the applicable codes, rules, and regulations.

1.06 PRE-INSTALLATION MEETINGS

- A. Meet with and coordinate Divisions 20, 21, 22, 23 work with the interrelated work of other trades including Architectural, Civil, Structural, Mechanical and Electrical to identify and resolve potential conflicts.
- B. Prior to installation of any Division 20, 21, 22, and 23 components, coordinate installation with trades responsible for portions of other related sections of the Project Manual.

1.07 SUBMITTALS

- A. Refer to Division 1 for general submittal requirements for the items listed below, supplemented with the additional requirements listed. In addition, prepare Divisions 20, 21, 22, 23 submittals in accordance with the following, to include any supplemental requirements listed in the specific specification section:
- B. General:
 - 1. The Contracting Agency's obligation to review submittals and to return them in a timely manner is conditioned upon the prior review and approval of the submittals by the Contractor as required by the Construction Contract.
 - 2. Submittal review is for general design and arrangement only and does not relieve the Contractor from any of the requirements of the Project Manual.
 - a. Submittals will not be checked for quantity, dimension, fit, or for proper technical design of manufactured equipment.
 - b. Provision of a complete and satisfactory working installation is the responsibility of the Contractor.
 - 3. Furnish suppliers with the applicable portions of the Project Manual and review and verify that the suppliers' submittals clearly represent products which comply with the Project Manual.
 - 4. Master Submittal Log
 - a. Create and maintain a master submittal log for items submitted in Divisions 20, 21, 22, 23, including test results, certifications, record drawings, etc.
 - b. Submit master submittal log, independent of other submittals, as the first submittal for review and approval by the Contracting Agency.
 - c. Update submittal log with each submittal action.
 - d. Share an electronic copy with Contracting Agency and Engineer at two week intervals, or as requested by the Contracting Agency.
- C. Coordination:
 - 1. Prior to a submittal's submission for approval, hold a meeting of all construction trades to review shop drawings and submittals. Each trade shall cross-check shop drawings and submittals for conflicts, clearances, physical space allocation and routing, discrepancies, dimensional errors, omissions, contradictions, departures from the Contract requirements, correct electrical/mechanical services and connections, and provisions for commissioning.
 - 2. Review, revise, correct, and appropriately annotate submittals prior to submission for approval.
 - 3. Keep a current copy of approved submittals and the submittal log at the job site.
- D. Electronic Submittals:
 - 1. Provide electronic submittals in PDF format in addition to hard copy submittal. Maximum file size to be coordinated with Contracting Agency.
 - 2. Follow the organization and formatting required for paper submittals.
 - 3. Provide electronic bookmarks within the PDF document in place of tabs and sub-tabs.

MECHANICAL GENERAL REQUIREMENTS

Division 20
Section 20 00 00

4. If individual PDF files are provided for a product or shop drawing sheet(s), organize files into folders and name files and folders to correspond with applicable specification sections or drawing titles.
 5. Create PDF documents without security, to be searchable, and to allow copy and paste. For scanned documents, run the optical character recognition (OCR) function to ensure the document is searchable and can be copied and pasted.
 6. Reduce PDF file size by removing data and file creation elements not needed for final file presentation.
- E. Product Data:
1. General:
 - a. This section describes in detail the preparation of mechanical product submittals. Submittals not provided as described shall be rejected without review. This procedure is designed to accelerate and improve the accuracy of the technical review process, as well as, simplify the preparation of the Installation, Operation, and Maintenance Manuals (IO&Ms).
 - b. Product data for each specification section shall be submitted in one complete package, except as noted in this section.
 2. Submittal Organization:
 - a. Organize product submittal information in the same order as the products are specified. Provide a separate tabbed divider for each Divisions 20, 21, 22, and 23 specification section. Provide the typed section number on each tab.
 - b. Within each section, organize product information in the same order as products are specified in Part 2 of each applicable specification section. Provide sub-tabs within each section for each separate product article. Provide the typed product article number on each tab.
 - c. Provide product submittal information for each product specified in 8-1/2" x 11" format. Fold-out 11" x 17" format is also acceptable.
 - d. If a particular specified product is being omitted from the product submittal or will not be used for the project, provide a single sheet within the article tab identifying the product and annotated with a brief reason why the product is not being submitted, for example: "NOT USED," NO SUBMITTAL REQUIRED," "TO BE SUBMITTED BY (PROVIDE DATE)," etc. This will inform the reviewer that the product was not overlooked.
 - e. Partial submittals from individual subcontractors may be provided which cover a particular sub-contractor's scope of work. In this case, arrange partial submittals by system classification such as: PLUMBING, HEATING, FIRE SUPPRESSION, VENTILATION, BUILDING AUTOMATION SYSTEM, etc. Within each system classification, arrange product submittals by specification section, as described, such that each specification section can easily be reorganized into a master set of Divisions 20, 21, 22, 23 product submittals organized by specification section. This will greatly simplify the preparation of IO&M manuals as described below.
 - f. Bind product submittal information in identical 3 inch wide, hard-backed, loose-leaf, 3 ring binders with clear front and spine insert pockets. Divide information into multiple volumes so that the pages in each binder rest naturally on one side of rings.
 - g. Provide a master table of contents at the front of each volume which lists the Divisions 20, 21, 22, 23 specification sections and indicates which sections are located within each volume.
 - h. Provide a table of contents within each section which lists the Part 2 products for that section in the same order as the applicable specification section.
 - i. Provide identical cover and spine inserts for each product submittal volume, to include the following typed information:
 - 1). The Contracting Agency Name. 2). Project Name.
 - 3). Contractor Name.
 - 4). Subcontractor Name preparing the submittal.

- 5). Date that the submittal or resubmittal was initiated.
 - 6). "Mechanical Product Submittals" or "Plumbing Product Submittals" etc. as appropriate.
 - 7). "Volume 1 of X, Volume 2 of X," etc.
3. Product Information:
- a. Indicate manufacturer's name and address, and local supplier's name, address, phone number.
 - b. Indicate each product as "Basis of Design", "Specified Equal" or "Proposed Substitution."
 - c. Identify catalog designation and/or model number.
 - d. Provide manufacturer's product literature. Neatly annotate to indicate specified salient features, appurtenances and performance criteria for each product specified to demonstrate compliance with the Project Manual to include scheduled information, drawing information and specified information.
 - e. Indicate product deviations from the Project Manual and mark out non-applicable items on generic "cut-sheets."
 - f. Include manufacturer provided dimensioned equipment drawings with rough-in mechanical and electrical connections.
 - g. Include operation characteristics, performance curves and rated capacities.
 - h. Include motor characteristics and wiring diagrams.
 - i. Include weight of equipment. Including accessories.
 - j. Provide basic manufacturer's installation instructions.
4. Product Substitutions:
- a. Clearly indicate both in the section table of contents and on the individual product submittal information each proposed substitution, deviation or change from the product as described in the Project Manual.
 - b. Submittal approval does not include substitutions, deviations or changes from the requirements of the Project Manual unless they are specifically itemized and approved. The term "No Exceptions Taken" will not apply to substitutions, deviations or changes not clearly identified.
 - c. Provision of a satisfactory working installation of equal quality to the system as described in the Project Manual shall be the responsibility of the Contractor.
 - d. Correct unapproved deviations from the Project Manual discovered in the field as directed by and at no additional cost to the Contracting Agency.
 - e. Cost of any design modifications as a result of proposed product substitutions shall be borne by the Contractor.
- F. System Drawings:
1. Submit System Drawings for dynamic elements/systems of the project which are performance specified to include but not limited to: Fire Suppression Systems, Building Automation Systems and stand-alone packaged equipment.
 2. Prepare system drawings on full sized sheets of the same size as the original construction drawings.
 3. Include with each system a sequence of operation narrative which describes each mode of system operation in sufficient detail to demonstrate compliance with the Project Manual to the satisfaction of the Contracting Agency.
- G. Shop Drawings:
1. General:
 - a. The Project Manual documents are not intended for nor are they suitable for use as shop drawings. Project Manual documents shall not be utilized for the actual fabrication or installation of products or equipment.
 - b. The Drawings are partly diagrammatic and do not show all offsets in piping or ducts, and may not show in minute detail all features of the installation; however, provide systems complete and in proper operating order.

MECHANICAL GENERAL REQUIREMENTS

Division 20
Section 20 00 00

- c. Locations of products are approximate unless dimensioned.
 - d. Divisions 20, 21, 22, 23 products and systems shall not be installed without shop drawings approved by the Contracting Agency.
 - e. Rework, changes or additional engineering support required as a result of the installation of products and systems prior to the approval of applicable shop drawings by the Contracting Agency shall be provided at the Contractor's expense.
 - f. Drawing symbols used for basic materials, equipment and methods are commonly used by the industry. Special items are identified by a supplementary list of graphical illustrations, or identified on the drawings or specifications.
2. Preparation:
- a. Review each Divisions 20, 21, 22, 23 specification section and identify the shop drawing requirements.
 - b. Combine the shop drawing requirements first by system (i.e. ventilation system, heating system, plumbing system, etc.) and then by area (i.e. fan room, boiler room, etc.).
 - c. Prepare shop drawings on full sized sheets of the same size as the original construction drawings.
 - d. Arrange shop drawings to scale, showing dimensions where accuracy of location is necessary for coordination or communication purposes.
 - e. Incorporate the actual dimensions and configurations of the products and systems approved through the product submittal process into the shop drawings.
 - f. Provide dimensioned maintenance clearance areas around each product as recommended by the manufacturer.
 - g. Coordinate Divisions 20, 21, 22, 23 work with the interrelated work of other trades including Architectural, Civil, Structural, and Electrical.
 - h. Identify and provide recommendations to resolve major conflicts which may impact the design of the systems as shown. Such conflicts will be resolved during the shop drawing review process.
 - i. Identify locations where field coordination between various trades is necessary to avoid conflicts.
 - j. Indicate elevation of piping, ductwork and equipment above or below finished floor at various locations and in sufficient detail to demonstrate clearance from structural elements and the work of other trades.
 - k. Coordinate placement of openings and holes through structure, walls, floors, ceilings, and roof with Structural and Architectural.
3. Submittal:
- a. Submit dimensioned shop drawings as specified to demonstrate proper planning and sequencing of the applicable trades for the installation and arrangement of Divisions 20, 21, 22, 23 with respect to other interrelated work.
 - b. Partial shop drawings submittals (i.e. heating system only) will be rejected without review, as the interrelationship with other related work and overall system fit cannot be evaluated.
 - 1). Underslab shop drawings may be submitted separately for review to accommodate the construction schedule.
 - c. It is assumed that shop drawings submitted for review have been thoroughly prepared and coordinated and that the products and systems can and shall be installed as shown. Conflicts which are not clearly identified and annotated on the submitted shop drawings are assumed not to exist.
 - d. Installation conflicts arising from the failure to properly coordinate the work of related trades shall be provided at the Contractor's expense.
- H. Certificates:
- 1. Review the submittal requirements for Certificates for each Divisions 20, 21, 22, 23 specification section.
 - 2. Submit copies of certificates as specified. This information may be included within the

MECHANICAL GENERAL REQUIREMENTS

Division 20
Section 20 00 00

Installation, Operations and Maintenance (IO&M) Manuals as determined by the Contracting Agency.

- I. Test and Evaluation Reports:
 1. Review the submittal requirements for Test and Evaluation Reports for each Divisions 20, 21, 22, 23 specification section.
 2. Submit copies of reports as specified. Also include these reports within the Installation, Operations and Maintenance (IO&M) Manuals as determined by the Contracting Agency.
- J. Installation, Operations and Maintenance (IO&M) Manuals:
 1. Review the submittal requirements for IO&M manuals for each Divisions 20, 21, 22, 23 specification section.
 2. Begin the preparation of the mechanical IO&M manuals with a complete and fully approved set of mechanical product data submittals organized, annotated and with the product information as indicated within the "Product Data" submittals article above and in each Divisions 20, 21, 22, 23 section.
 3. Next, augment each individual product submittal with the written installation, operations and maintenance information for each approved product. This type of information is not applicable (or available) for bulk commodity or simplistic products such as copper pipe, basic pipe hangers or equipment tags, etc.
 4. Annotate the installation, operations and maintenance information to indicate applicable information for the specific equipment model(s) installed.
 5. Maintenance information shall include:
 - a. Preventive maintenance requirements for each product, including the recommended frequency of performing each preventive maintenance task.
 - b. Instructions for troubleshooting, minor repair and adjustments required for preventive maintenance routines, limited to repairs and adjustments that may be performed without special tools or test equipment and that require no extensive special training or skills.
 - c. Information of a maintenance nature covering warranty items, etc., that have not been discussed in the manufacturers' literature.
 - d. Information on the spare and replacement parts for each product and system. Properly identify each part by part number and manufacturer.
 - e. Recommended spare parts list.
 6. Organize the IO&M manual information by specification section (not by sub-contractor) with a tabbed divider separating each section. Provide the typed section number on each tab.
 7. Within each section, organize the product information in the same order as the products are specified in Part 2 of each applicable section. Provide sub-tabs within each section for each product. Provide the typed product article number on each tab.
 8. Bind the information in identical 3 inch wide; hard-backed, loose-leaf, 3 ring binders with clear front and spine insert pockets. Divide information into multiple volumes so that the pages in each binder rest naturally on one side of rings.
 9. Provide a master table of contents at the front of each volume which lists the Divisions 20, 21, 22, 23 specification sections and indicates which sections are located within each volume.
 10. Provide a table of contents within each section which lists the Part 2 products for that section in the same order as the applicable specification section.
 11. Provide identical cover and spine inserts for each IO&M manual volume, to include the following typed information:
 - a. The Contracting Agency Name.
 - b. Project Name.
 - c. "Mechanical Installation, Operations and Maintenance Manual".
 - d. "Volume 1 of X, Volume 2 of X," etc.
 12. Submit copies of Operation and Maintenance Manuals in electronic format (Adobe PDF).

1.08 CLOSEOUT SUBMITTALS

A. Warranty Documentation:

1. Review the manufacturer's warranty requirements for each Divisions 20, 21, 22, 23 specification section. Unless stated otherwise, provide 1-year warranty.
2. Submit required warranty documentation to the applicable Manufacturer's Representative to validate standard manufacturer's warranty for each required product. Obtain written confirmation of receipt from each applicable Manufacturer's Representative.
3. Provide Contracting Agency one copy of submitted warranty documentation and written confirmation of receipt for each applicable Manufacturer's Representative. This information may be included within the Operations and Maintenance (IO&M) Manuals as determined by the Contracting Agency.
4. Provide statement of Contractor's warranty of workmanship, labor, and materials, as described under Article 1.12 Warranty below.

B. Record Documentation:

1. General: As the Work progresses, neatly annotate a designated and otherwise unused set of Divisions 20, 21, 22, 23 Contract Drawings to show the actual locations and routing of Divisions 20, 21, 22, 23 Work and the terminal connection points to related Work. As a minimum, include the following:
 - a. Annotate record drawings to incorporate each applicable addendum.
 - b. Annotate record drawings as directed by each applicable Request for Information (RFI) and accepted Change Order Proposal.
 - c. Modify record drawings to show actual equipment sizes and locations and pipe and duct routing. Revise pipe and duct sizes as appropriate.
 - d. Provide dimensioned locations for permanently concealed piping and ductwork (i.e. piping cast in concrete or buried underground/underslab).
 - e. Show the actual locations of system isolation valves, especially valves which are concealed above ceilings and behind access panels.
2. Preparation:
 - a. Neatly annotate record drawings to provide clear interpretation to support electronic drafting by a third party.
 - b. Tape electronic sketches from addendums and/or RFIs directly to the record drawings as overlays.
 - c. Annotate the record drawings in colored pencil using the same symbols and abbreviations as indicated in the Divisions 20, 21, 22, 23 legends and schedules of the Contract Drawings.
 - 1). Red to add information.
 - 2). Green to delete information.
 - 3). Blue to provide additional clarifying information which is not to be drafted.
 - d. After submittal to the Contracting Agency, provide additional clarification, information or rework as necessary to support the accurate interpretation and electronic drafting of the record drawings.
3. Submittals:
 - a. Provide dimensioned underslab record drawings to the Contracting Agency prior to placing the slab. For slabs placed in multiple sections, provide record drawings for the applicable slab sections to the Contracting Agency prior to each pour.
 - b. Provide complete record drawings for concealed areas (i.e. above lay-in and hard ceilings and inside walls) to the Contracting Agency prior to concealment.
 - c. Provide the remaining portion of the record drawings for exposed areas to the Contracting Agency prior to the final completion of the project.

1.09 MAINTENANCE MATERIAL SUBMITTALS

A. Spare Parts:

MECHANICAL GENERAL REQUIREMENTS

Division 20
Section 20 00 00

1. Furnish spare parts for systems and equipment as listed in applicable sections of Divisions 20, 21, 22, 23.
 2. Clearly label each part with name, manufacturer's part number, system and/or equipment where used and location.
 3. Deliver parts to location and person designated by the Contracting Agency, in durable storage boxes.
 4. Group cartons containing smaller items by system or application and deliver in an appropriate number of storage boxes.
- B. Extra Stock Materials:
1. Furnish extra stock as listed in applicable sections of Divisions 20, 21, 22, 23.
 2. Clearly label with name, manufacturer's part number, system and/or equipment where used and location.
 3. Deliver to location and person designated by the Contracting Agency, in durable storage boxes.
- 1.10 QUALITY ASSURANCE
- A. Qualifications:
1. Manufacturers: Companies specializing in manufacturing the Products specified in the Divisions 20, 21, 22, 23 sections with minimum 3 years documented experience.
 2. Fabricators: Companies specializing in fabricating the Products specified in the Divisions 20, 21, 22, 23 sections with minimum 3 years documented experience.
 3. Installers: Perform the Work using qualified workmen that are experienced and usually employed in the trade.
 4. Testing Agencies: Products requiring electrical connection shall be listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and as indicated.
- B. Product Testing and Certification:
1. Nationally Recognized Testing Laboratory (NRTL) Labeling: Electrical equipment and conductors shall be "Approved," "Certified," "Identified," or "Listed" and "Labeled" to establish that the electrical equipment is safe, free of electrical shock and fire hazard, and suitable for the purpose for which it is intended to be used. The manufacturer shall have the specific authorization of one of the Occupational Safety and Health Administration (OSHA) approved Nationally Recognized Testing Laboratories (NRTLs) in accordance with the applicable national standards to label the equipment as suitable.
 2. Where the words Listed, UL Listed, UL Labeled, Underwriters Laboratories, Inc., UL, or variations of this terminology, appear under this Division of the Specifications or the associated drawings, it is understood that a comparable testing agency as defined by NRTL above is acceptable.
 3. Such testing and certification is generally applicable to products within the following categories:
 - a. Life safety and fire suppression.
 - b. Fuel burning equipment, except certain classes of power or industrial equipment for which other recognized certification applies as well.
 - c. Factory fabricated and wired electrical control panels and packaged equipment with factory installed electrical controls or panels.
 - d. Components for life safety systems, fuel systems and medical gas systems.
 4. The listing under Paragraph '3' above is provided for illustration of requirements and is not exclusive. Provide products that have been tested and listed for the intended application when such products are available unless the Contracting Agency has provided written exemption on an itemized basis.
 5. Provide electrical products listed and labeled by UL, FM, ETL or other approved NRTL. If listing and labeling is not available, stamp the submittal for these products by an Alaska Registered Professional Engineer approved by the Authority Having Jurisdiction, at no additional cost.

6. Where interpretation is required, the Contracting Agency will provide direction and will be the sole judge in cases of compliance with this subsection.

1.11 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 1. Verify products are new and delivered in original factory packaging/crating and are free from damage and corrosion.
 2. Replace products delivered to job site that does not comply with above requirements at no expense to Owner.
 3. Remove damaged, or otherwise unacceptable, products from the project site when directed by the Contracting Agency.
- B. Storage and Handling Requirements:
 1. Store products in covered storage area protected from the elements, outside the general construction area until installed. Maintain ambient conditions required by manufacturer of each product.
 2. Store products in original factory packaging until actual installation.
 3. Handle items carefully to avoid breaking, chipping, denting, scratching, or other damage.
 4. Replace damaged items with same item in new condition.

1.12 WARRANTY

- A. See Division 1 for general warranty requirements.
- B. Warranty workmanship, labor, and materials for a period of one year from the date of final acceptance, without limitation, except where longer warranty periods are specified in a specific Section under this Division, or in the General Conditions of the Contract. Promptly coordinate and perform Warranty work at the Contractor's sole expense.
- C. Submit necessary documentation to each appropriate Manufacturer's Representative to validate manufacturer's warranty.
- D. Provide one copy of warranty documentation and confirmation receipt from the Manufacturer's Representative.

PART 2 - PRODUCTS - NOT USED PART 3 - EXECUTION

3.01 PREPARATION

- A. Protection of In-Place Conditions:
 1. Cover and protect open ends and individual components of the ventilation and piping systems during construction when dust, dirt, debris, overspray, or other potential construction contaminants could enter the air distribution system or elements (ducts, fans, VAV boxes, silencers, etc.).
 2. Provide temporary construction filters over return airshaft openings and at air handling unit return air dampers.

3.02 INSTALLATION

- A. Special Techniques:
 1. Provide temporary heating to maintain the building at 65 degrees F.
 2. Provide temporary ventilation with filtration during construction.
- B. Interface with Other Work:
 1. Electrical Work: Coordinate with Division 26.
 2. Coordination with Room Numbering:
 - a. Certain systems provided under this Division rely on identification systems that are

- based on room names or numbers.
- b. The numbering scheme indicated in this Project Manual is based on room numbers assigned during the design process.
- c. The Contracting Agency reserves the right to change the numbers prior to Substantial Completion, and the final names and numbers will not necessarily match those found in the Project Manual.
- d. Obtain from The Contracting Agency the final room numbers prior to commencing the numbering of Divisions 20, 21, 22, 23 systems.
- e. Tag and label system equipment and devices in accordance with the final numbering scheme at no additional cost.

3.03 REPAIR/RESTORATION

- A. Touch-up, repair or replace product components broken during installation or startup with new replacement parts supplied by the product manufacturer.
- B. Substitute replacement parts from other manufacturers are not acceptable.
- C. Clean and repair existing identification tags/labels, hangers, supports, insulation, materials, instrumentation, and equipment that remain or are to be reused or are affected by this work. Materials and equipment which require major repair may be replaced at the Contractor's option.
- D. Plug, patch and repair surfaces, adjacent construction, and finishes damaged during demolition and new work. Restore to original condition or better including fire, smoke or temperature ratings or listings. Retexture surfaces to match surrounding surfaces. Repaint affected surfaces, with extent of paint to include adjacent surfaces to next wall or other clean break to avoid mismatched finish. Replace cracked or damaged ceiling tiles. Repair fire proofing, assembly fire ratings, and construction resistant to the passage of smoke.

3.04 SITE QUALITY CONTROL

- A. Site Tests and Inspections:
 - 1. The Contracting Agency may inspect and approve sample installation of systems and equipment prior to general installation of units.
 - 2. Schedule, obtain, and pay for fees and/or services required by the local Authorities Having Jurisdiction and by these specifications, to test the mechanical systems.
 - 3. Notify the Contracting Agency a minimum of 24 hours in advance of tests. Certify in writing that specified tests have been made in accordance with the specifications.
 - 4. Immediately correct deficiencies that are discovered during the tests and repeat tests until system is approved. Do not cover or conceal piping, equipment or other portions of the mechanical installations until satisfactory tests are made and approved.
 - 5. Under the direction of the Contractor and in the presence of the Contracting Agency, place the entire mechanical installation and/or any portion thereof in operation to demonstrate satisfactory operation.
 - 6. Arrange for the Contracting Agency to witness tests. The Contracting Agency may waive witnessing any specific test at its discretion.
- B. Non-Conforming Work:
 - 1. Expediently remove and provide new for work not conforming to the Project Manual upon discovery, including warranty and discovery periods.
 - 2. Warranty period shall start over for replaced equipment and installation from the date of accepted by the Contracting Agency.
- C. Manufacturer Services:
 - 1. Authorized manufacturer's representative shall be on-site for testing, start-up, functional check-out, and commissioning of equipment and systems.
 - 2. Procurement, installation, start-up, and warranty services to be provided by manufacturer's authorized representative and service company.

3. Equipment, devices, hardware, and software to be approved for application, and of current production. Original manufacturer's parts, hardware, software, and support to be available for ten years after installation.

3.05 CLEANING

- A. Upon completion of installation and prior to initial operation, remove debris, and clean and wipe down equipment, piping, ductwork, and floor to eliminate dust and dirt.

3.06 CLOSEOUT ACTIVITIES

- A. Demonstration: Provide demonstration, conducted by authorized factory start-up personnel, to the Contracting Agencies authorized personnel as listed in each individual specification section.
- B. Training: In addition to training specified in each individual specification section, provide 2 additional hours of operational instruction conducted by qualified personnel, covering any of the mechanical systems and installation requested by the Contracting Agency to its authorized maintenance personnel.

3.07 PROTECTION

- A. Provide finished products with protective covers during balance of construction.
- B. Provide open duct ends, grilles and diffusers with protective covers during balance of construction.
- C. Provide open pipe ends with protective caps during balance of construction.

END OF SECTION

MECHANICAL DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Demolition and removal of selected mechanical systems, equipment and selected components.
- B. See Division 1 for general demolition requirements and disposal of demolished materials.
 - 1. Coordinate the demolition and disposal of materials and equipment with Contracting Agency.
 - 2. Provide Contracting Agency with the first right of refusal for the salvage of demolished equipment and materials.
- C. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. See Section 20 00 00 - Mechanical General Requirements.

1.05 DEFINITIONS

- A. Demolish: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.06 SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements.
- B. Submit a demolition and construction plan for review by the Contracting Agency prior to

beginning work. Describe procedures that will be used to protect and maintain cleanliness of the adjacent building areas/systems during construction.

1.07 QUALITY ASSURANCE

- A. See Section 20 00 00 - Mechanical General Requirements.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI A10.6 - Safety and Health Program Requirements for Demolition Operations, and NFPA 241 - Standard For Safeguarding Construction, Alteration, And Demolition Operations.
- D. Pre-demolition Meetings: Conduct coordination meetings prior to demolition as required by Division 1.

1.08 PROJECT CONDITIONS

- A. Adjacent portions of the building will remain partially occupied during selective demolition. Conduct demolition such that Owner's operations will not be disrupted.
- B. Drawings and specifications involving existing conditions are based on building record drawings and limited field observation. Provide field verification. Addition building record drawings are available from the Owner with a written request.
- C. Notify Contracting Agency of discrepancies between existing conditions and the Contract Documents before proceeding with demolition.
- D. Hazardous Materials: The existing roof construction, to include the existing mechanical penetrations through the roof is likely to include materials which contain asbestos. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Contracting Agency and coordinate the demolition of such hazardous materials in accordance with the hazardous materials abatement procedures specified in Division 1.
- E. Maintain existing utilities to the maximum extent possible. Coordinate outages, if necessary, in accordance with Division 1.
- F. Maintain fire-protection systems in service during mechanical demolition operations.
- G. Storage or sale of removed items or materials on-site is not permitted.

1.09 WARRANTY

- A. See Section 20 00 00 - Mechanical General Requirements.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Drawings and specifications involving existing conditions are based on building record drawings and limited field observation.
- B. Conduct a site inspection prior to submission of Bid to become thoroughly familiarized with the Scope of Work. Review actual site conditions and compare with the Contract Documents mechanical demolition drawings. Obtain direction from Contracting Agency for

identified conflicts.

- C. Inventory and record the condition of items to be removed, removed and reinstalled or removed and salvaged. Provide Contracting Agency with first right of refusal for the salvage of demolished equipment and materials.
- D. Verify field measurements, locations, sizes, and routing arrangements and site conditions.
- E. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Contracting Agency for direction.
- F. Commencement of demolition implies Contractor accepts existing conditions.

3.02 PREPARATION

- A. Maintain existing utilities in operation to the maximum extent possible during the selective demolition of mechanical systems. When utility outages are necessary, coordinate outages and their duration with Contracting Agency in accordance with Division 1. Arrange to shut off indicated utilities with utility companies.
- B. "Tag" equipment and systems to be demolished. Identify the extent to which each system will be demolished.
- C. Locate, identify, isolate, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
- D. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- E. Coordinate with the Contracting Agency to provide a central staging area for the temporary storage of demolished equipment and systems.
- F. Identify hazardous materials which will be demolished (i.e. mercury thermostats, etc.). Provide and designate a segregated temporary storage area for demolished hazardous materials organized by hazard type.

3.03 DEMOLITION - GENERAL

- A. General:
 - 1. Demolish and remove existing mechanical equipment and systems only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 2. Terminate ductwork and piping back to branch connections and replace tees and fittings with straight couplings. Terminate electrical circuits back to panel (See Divisions 26 and 28). Remove unused ductwork, piping, conduit and associated hangers and other support devices.
 - 3. Abandonment in place of unused equipment and systems affected by the remodel is not allowed.
 - 4. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 5. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 6. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 - 7. Promptly transport and dispose of demolished equipment, systems, and material at the closest approved dump site.

- B. Controls:
 - 1. Sequence limited demolition of the controls system.
 - 2. Limited scheduled outages are acceptable for system cross-over.
 - 3. Coordinate outages with Contracting Authority 24 hours in advance of the scheduled outage.
- C. Indoor Air Quality:
 - 1. Maintain cleanliness and indoor air quality in areas adjacent to construction areas.
 - 2. Submit a demolition and construction plan for review by the Contracting Agency prior to beginning work.
 - 3. Reference SMACNA IAQ Guidelines for Occupied Buildings Under Construction - Second Edition - 2007.
- D. Fire Protection: Notify the Contracting Agency and the Fire Department Agencies at least 24 hours before partially or completely disabling Fire Protection Systems.
- E. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Contracting Agency.
 - 4. Transport items to Contracting Agency designated on-site storage area.
 - 5. Protect items from damage during transport and storage.
- F. Removed and Reinstalled Items:
 - 1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- G. Existing items to Remain:
 - 1. Protect construction indicated to remain against damage and soiling during selective demolition.
 - 2. When permitted by Contracting Agency, items may be removed to a suitable, protected storage location during demolition and cleaned and reinstalled in their original locations after demolition operations are complete.

3.04 CLEANING AND REPAIRS

- A. Plug, patch and repair surfaces, adjacent construction, and finishes damaged during demolition and new work. Restore to original condition or better. Retexture surfaces to match surrounding surfaces. Repaint affected surfaces, with extent of paint to include adjacent surfaces to next wall or other clean break to avoid mismatched finish. Repair fire proofing.
- B. Clean construction areas after completion of the project. Wipe down new and existing surfaces including but not limited to walls, floors, ductwork, piping and equipment. Clean adjacent equipment and systems to remain and building surfaces of dust, dirt, and debris caused by demolition operations.
- C. Return adjacent areas to the condition existing before demolition operations began.

END OF SECTION

MECHANICAL HANGERS AND SUPPORTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Hanger, support and anchoring requirements for plumbing and mechanical appliances, equipment, and related distribution systems.
 - 2. Building wall, floor, and roof penetration methods for the routing of plumbing and mechanical distributions systems (e.g., sleeving and sealants).
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 20 05 48 - Vibration and Seismic Control
 - 3. 20 05 53 - Mechanical Identification
 - 4. 22 11 00 - Domestic Water Piping and Specialties
 - 5. 22 13 00 - Sanitary Waste and Vent Piping and Specialties
 - 6. 22 40 00 - Plumbing Fixtures
 - 7. 23 31 00 - Ducts and Accessories

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 RELATED WORK

- A. The building structure shall be designed to support the weight of plumbing and mechanical appliances, equipment, and distribution systems (non-structural components), as well as related seismic and wind forces in accordance with ASCE/SEI 7.
- B. See Structural drawings for appliance and equipment housekeeping pad material, construction, and attachment. Actual housekeeping pad locations, dimensions and through penetrations shall be coordinated with approved appliance and equipment base dimensions, weights, and anchoring requirements using the product submittal and shop drawing process.

1.05 REFERENCES

- A. Codes and Standards:
 - 1. Refer to Section 20 00 00 - Mechanical General Requirements for general Code and

Standard references.

2. MSS SP69 - Pipe Hangers and Supports - Selection and Application.
 3. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
 4. ASCE/SEI 7-16 Minimum Design Loads for Buildings and Other Structures - Chapter 13 (Anchorage Requirements) and Chapter 29 (Wind Load Requirements).
- B. Abbreviations, Acronyms and Definitions:
1. See Section 20 00 00 - Mechanical General Requirements for general abbreviations, acronyms, and definitions.
 2. See Mechanical Drawings (Legend and Abbreviations).

1.06 DESCRIPTION

- A. This section applies to Division 20, 21, 22, 23 equipment and systems:
1. Support fire suppression system piping and equipment in accordance with Section 21 10 00 - Water Based Fire Suppression Systems.
 2. Support plumbing piping, appliances, and equipment in accordance with this section and Uniform Plumbing Code (UPC) requirements as applicable, whichever is more restrictive. In case of conflicts, follow UPC criteria.
 3. Support mechanical system piping, appliances, and equipment in accordance with this section and International Mechanical Code (IMC) requirements as applicable, whichever is more restrictive. In case of conflicts, follow IMC criteria.
 4. Support ductwork in accordance with Section 23 31 00 - Ducts and Accessories.
 5. Provide additional seismic restraint as required for mechanical and plumbing appliances, equipment, and related distribution systems in accordance with 20 05 48 - Vibration and Seismic Control.
- B. Design Requirements:
1. Appliance, equipment, and related distribution system support:
 - a. Select and apply pipe hangers and supports using stock or production parts whenever possible.
 - b. Design support spacing such that free span of piping does not exceed code or MSS SP58 criteria, whichever is most restrictive.
 - c. Calculate required supporting force at each hanger location to confirm hanger type and hanger rod diameter selection.
 - d. Provide hangers such that equipment connection points do not carry connected piping load.
 - e. When possible, adjust hanger spacing, hanger rod length/diameter to meet the seismic design exclusion criteria of ASCE/SEI 7 to minimize the need for additional seismic restraint.
 2. Vibration and seismic restraint systems: If the exclusion criteria of ASCE/SEI 7 cannot be met, provide additional seismic support as required for mechanical and plumbing appliances, equipment, and related distribution systems in accordance with 20 0548 - Vibration and Seismic Control.
 3. Building Design Criteria:
 - a. This project is not designated as an essential facility.
 - b. Seismic design data: See Structural Design Criteria Schedule.
 - c. Component Importance Factors, I_p :
 - 1). Fire suppression systems: $I_p = 1.5$
 - 2). Piping Importance Factor: $I_p = 1.0$
 - 3). All other components: $I_p = 1.0$
- C. General Performance Requirements:
1. Plumbing and mechanical distribution systems as shown are semi-diagrammatic.

2. Provide additional hangers, expansion loops, pipe anchors and pipe guide assemblies as required based on actual (as-built) distribution system layout/routing.
 3. Coordinate hanger and support anchor locations and methods with structural.
 4. Provide hangers and supports that allow for the free expansion and contraction of system piping without transferring tensile and compressive stresses to adjacent supports or connected equipment.
- D. Special Performance Requirements for Open Ceiling Spaces:
1. Coordinate the routing and support of ductwork, piping, electrical conduit, lighting and other equipment in open ceiling spaces (using the shop drawing review process) to provide a uniform and symmetrical appearance.
 2. In general, use trapeze hanger style support systems with hangers equally spaced based on the limiting component supported. Provide hanger rods vertical and straight. Trim hanger rod ends to provide a "finished" uniform appearance.

1.07 SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements for general submittal requirements for the items listed below, supplemented with the additional requirements listed.
- B. Product Data:
1. Provide manufacturer's catalog data, including load capacity and anchor embedment requirements.
 2. Manufacturer's Installation Instructions: Indicate special tools, procedures, and assembly of components.
- C. Shop Drawings:
1. Submit shop drawings for field fabricated support systems.
 2. For plumbing and mechanical distributions system shop drawings:
 - a. Overlay locations and types of hangers and supports to be provided.
 - b. Include details for each hanger and support type with anchorage requirements.
 - c. Coordinate additional seismic and vibration isolation requirements with Section 20 05 48 - Vibration and Seismic Control.

1.08 CLOSEOUT SUBMITTALS

- A. Record Documentation:
1. Indicate installed hanger locations, supports and expansion control assemblies on applicable contractor as-built drawings.
 2. Provide Operating and Maintenance Data (installation and adjustment instructions) for non-commodity products.

1.09 QUALITY ASSURANCE

- A. Qualifications:
1. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 3 years documented experience.
 2. Installers: Minimum 3 years' experience.
 3. Provide piping and support systems designed and manufactured per MSS SP58.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. See Section 20 00 00 - Mechanical General Requirements.

1.11 WARRANTY

- A. See Section 20 00 00 - Mechanical General Requirements.

PART 2 - PRODUCTS

1.12 PIPE HANGERS AND SUPPORTS

A. General:

1. Piping and support systems material: Malleable iron, steel, or copper.
2. Hot dipped galvanized ferrous hangers and supports installed outdoors or in unheated spaces.
3. Select and apply pipe hangers and supports per MSS SP58. Use stock or production parts when possible.
4. Fabricate and install pipe hangers and supports per MSS SP58 recommended practices.
5. Hangers shall securely lock using a mechanical fastener. Hangers and supports using gravity type locking are not acceptable. For example, adjustable swivel ring Type 6 is not allowed.
6. Pre-engineered support systems (e.g., Unistrut, Super-Strut, B-Line) may be used in accordance with manufacturer's load limits.
7. Manufacturers: Grinnell, M-CO Michigan Hanger Company, Kin Line or equal.

B. Plumbing Piping:

1. Conform to the Uniform Plumbing Code requirements.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Adjustable swivel ring; split ring.
3. Hangers for DWV and Cold Pipe Sizes two inch and over: Carbon steel, adjustable, clevis.
4. Hangers for Hot Pipe sizes two to four inch: Carbon steel, adjustable, clevis.
5. Multiple or Trapeze Hangers under six inches: Steel channels with welded spacers and hanger rods.
6. Wall Supports: Welded steel bracket and wrought steel clamp.
7. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and steel support.
8. Floor Support for Hot Pipe Sizes up to four inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and steel support.
9. Vertical Support: Steel riser clamp.
10. Provide copper plated hangers and supports for copper piping. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Hydronic Piping:

1. Conform to ASME B31.9 and the International Mechanical Code.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Adjustable swivel ring; split ring.
3. Hangers for Hot Pipe sizes two to four inch: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support: Welded steel bracket and wrought steel clamp.
6. Vertical Support: Steel riser clamp.
7. Provide copper plated hangers and supports for copper piping. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

1.13 DUCTWORK HANGERS AND SUPPORTS

- A. Provide hangers and supports for ductwork in accordance with Section 23 31 00 - Ducts and Accessories.

1.14 ACCESSORIES

- A. Hanger Rods: Mild steel, threaded both ends, threaded one end, or continuous threaded.
- B. Escutcheons: Nickel or chrome plate with screws or springs for holding plate in position.
- C. Pipe Protection Saddles: Shop fabricate or purchase specially manufactured saddles specifically designed for the intended use. Provide saddles where roller type support is used,

or where the pipe hanger is installed outside the insulation for protection of insulating jacket.

1.15 INSERTS

- A. Provide inserts to match the load bearing capacity of hangers.

1.16 PRE-ENGINEERED SUPPORT SYSTEMS

A. Manufacturers:

1. Unistrut.
2. Super-Strut.
3. B-Line.
4. K-Line.
5. Erico.
6. Approved equal.

B. Materials and Finish:

1. Heated Indoor Applications:
 - a. Carbon steel with pre-galvanized zinc (PG) finish.
 - b. Carbon steel with plain (PL), paintable galvanized, or phosphatized and primed when welding or painting will be required.

C. Channel:

1. Standard Size: 1-5/8 inch x 1-5/8 inch. Gauge thickness as required for attached load.
2. Standard Hole Pattern: Slotted. Provide solid channel in exposed public areas.

D. Fittings: Match channel material and finish.

E. Nuts and Hardware:

1. Channel nuts: Hardened steel (ASTM-A675 and ASTM A36).
2. Bolts, screws, and nuts: Hardened steel (ASTM-A307, ASTM A563 and SAE J429).
3. Material and Finish:
 - a. Heated indoor applications: Electro-galvanized (EG).

F. Mechanical Accessories: Provide accessories from the support system manufacturer designed for the specific equipment to be supported, to include but not limited to:

1. Pre-insulated pipe hanger inserts to permit continuous insulation at the pipe clamps: Unistrut model PUX, Armaflex model IPPH.
2. Splice and gusset plates.
3. Corner angles.
4. Specialized support brackets.
5. Beam clamps with restraints.
6. Column supports.
7. Strut pipe clamps.
8. Straps.
9. Brackets.

2.1 SEISMIC RESTRAINT SYSTEMS

- A. See Section 20 05 48 - Vibration and Seismic Control.

2.2 SLEEVES, ACOUSTICAL SEALS AND FIRE-STOPPING

- A. Fabricate sleeves in non-load bearing walls from 20-gauge galvanized sheet steel conforming to ASTM A924 / A924M.
- B. Fabricate sleeves in load-bearing walls from standard-weight galvanized steel pipe conforming to ASTM A53 / A53M.
- C. Provide UL listed prefabricated fire rated sleeves and seals for pipes through fire rated and fire resistive floors and walls.

2.3 FRAMED OPENINGS

- A. Provide structural steel members for framed openings conforming to ASTM A36 / A36M.
- B. Closure Collars:
 - 1. For round and rectangular ducts with a minimum dimension less than 16 inches, fabricate collars from 20 gauge galvanized steel.
 - 2. For round and rectangular ducts with a minimum dimension of 16 inches or greater, fabricate collars from 18 gauge galvanized steel.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Visually inspect appliances, equipment and distribution systems requiring anchorage/attachment to structure for installation location tolerance, interference and other conditions affecting installation.
- B. Verify actual locations of cast-in-place anchors, structure reinforcements and other required attachments prior to installation.
- C. Document and correct deficiencies or submit proposed design modifications for approval prior to the installation.

3.02 PREPARATION

- A. Prior to installation, prepare detailed shop drawings of the planned installation of hanger and support products specified by this section. Coordinate the location, type and size of hangers and supports, housekeeping pads (thickness/perimeter overhang dimensions) and roof curbs with Architectural and Structural elements using the shop drawing review process.
- B. If exclusion criteria of ASCE/SEI 7 cannot be met, coordinate and provide additional seismic support as required for mechanical and plumbing appliances, equipment, and related distribution systems in accordance with 20 05 48 - Vibration and Seismic Control.
- C. Submit shop drawings required by this section coordinated with the additional seismic design as required.
- D. Do not install hangers and supports without approved shop drawings.

3.03 INSTALLATION

- A. Attachment:
 - 1. Hollow masonry: Toggle bolts.
 - 2. Solid masonry and concrete: Preset inserts or expansion bolts.
 - 3. Structural steel: Beam clamps which engage both sides of structural member or have retaining clips or other approved means for positive engagement.
 - 4. Metal surfaces: Machine screws, bolts, or welding.
 - 5. Wood construction: Wood or sheet metal screws.
 - 6. Do not use powder-actuated fasteners for anchorage in tension applications. Obtain written permission from the Owner prior to using any type of powder -actuated studs.
 - 7. Plastic screw inserts and caulked lead inserts are prohibited, except for mounting instructions and control diagrams.
- B. Pipe Hangers and Supports:
 - 1. Install hangers and supports in accordance with manufacturer's instructions, applicable code requirements and approved shop drawings.
 - 2. Pipe Support: Provide pipe support spacing as indicated in the table below, except where spacing is more restrictive by Code.

PIPE SIZE (Inches)	HANGER SPACING MAX (Feet)			
	Steel		Copper	CPVC (1)
	Water Filled	Gas Filled		
1/2	7	9	5	
3/4	7	9	5	
1	7	9	6	
1-1/4	7	9	7	
1-1/2	9	12	8	
2	10	13	8	
2-1/2	11	14	9	
3	12	15	10	
4	14	17	12	
6	17	21	14	

(Based on Table 4, MSS SP-58, except for PE piping)

(1) (Based on manufacturer's data)

3. Independently support piping at equipment, such that the equipment supports no weight.
 4. Insulated piping: Coordinate with Section 20 07 00 - Mechanical Insulation. Provide insulation saddles or 18 gauge steel insulation shields combined with sections of calcium silicate or cellular glass or provide pre-insulated pipe hanger inserts to permit continuous insulation at the pipe hangers or clamps.
 - a. Support cold piping outside the insulation and vapor barrier where continuous vapor barrier is specified:
 - b. Subject to approval, hot piping may be insulated around the supports.
 5. Provide trapeze hangers when more than three pipes run parallel and at same elevation.
 6. Provide roller supports for hot pipes. Provide saddles where roller type support is used, or where the pipe hanger is installed outside insulation for protection of insulating jacket.
 7. Design rods and cross members to support three times the weight of pipes and contents plus 250 pounds.
 8. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent work.
 9. Place hangers within 12 inches of each horizontal elbow.
 10. Use hangers with 1-1/2 inch minimum vertical adjustment.
 11. Support horizontal cast iron pipe adjacent to each hub, with five feet maximum spacing between hangers.
 12. Support riser piping independent of connected horizontal piping.
- C. Penetrations:
1. Coordinate mechanical penetrations with Architectural and Structural construction details prior to installation. Set sleeves in position in concrete formwork. Provide reinforcement around sleeves as required.
 2. Provide compatible materials, fasteners, adhesives, sealants, and other products required for proper installation.
 3. Provide penetrations through roof, exterior walls, and floors (See floor penetration seals) to be weather and watertight.
 4. Provide UL rated fire-stopping assemblies for rated roof, wall, and floor penetrations in accordance with Division 7.
 5. Seal penetrations through smoke partitions and barriers to resist the passage of smoke.

6. Sleeves:
 - a. Provide sleeves for pipe and round ducts less than 16 inches diameter passing through floors, walls, ceilings, or roofs.
 - b. Provide 1 inch clearance between the pipe/duct and sleeve opening. Oversize sleeves for cold piping to allow continuous insulation with vapor barrier through the sleeve. Coordinate with UL listed firestop through penetration details.
7. Framed Openings:
 - a. Provide framed openings for round ducts 16-inch diameter and greater and rectangular ductwork passing through floors, walls, ceilings, or roofs.
 - b. Provide 1-inch clearance between the duct and framed opening.
 - c. Provide closure collars not less than 4 inches wide on each side of penetration.
 - d. Escutcheons: Provide escutcheons for ductwork, piping and conduit passing through walls, floors, and ceilings in finished areas, below counters and inside closets and casework subject to view when doors are open. Size escutcheons to cover sleeves. Secure escutcheons in position.
8. Floor Penetration Seals:
 - a. Provide water-tight sleeves at floor penetrations and extend sleeve height two (2) inches above finished floor or as detailed.
 - b. Sleeves may terminate flush with top of concrete housekeeping pads unless detailed otherwise.
 - c. Grout and seal sleeves to floor and seal annulus between pipe and sleeve to create a watertight penetration assembly.
 - d. Floor penetrations to include but not limited to plumbing and mechanical distribution system piping and ductwork.
 - e. Coordinate with UL listed firestop through penetration details.

3.04 INTERFACE WITH OTHER WORK

- A. Coordinate and sequence installation of hangers and supports with trades responsible for portions of this and other related sections of the Project Manual.

3.05 REPAIR/RESTORATION

- A. Repair any product components broken during installation or startup with replacement parts supplied by the product manufacturer.
- B. Substitute replacement parts from other manufacturers are not acceptable.

3.06 SITE QUALITY CONTROL

- A. Non-Conforming Work: Rework required as a result of failure to follow the manufacturer's written installation instructions or to properly coordinate with related Work shall be completed at no additional expense to the Owner.

3.07 CLEANING

- A. Waste Management: After construction is completed, clean and wipe down exposed surfaces.

END OF SECTION

VIBRATION AND SEISMIC CONTROL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Performance requirements for the design, product selection and installation of seismic and vibration control anchors, bracing and supports for nonstructural mechanical, electrical, and plumbing (MEP) system components.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 20 05 29 - Hangers and Supports
 - 3. 20 07 00 - Mechanical Insulation
 - 4. 22 11 00 - Domestic Water Piping and Specialties
 - 5. 22 13 00 - Sanitary Waste and Vent Piping and Specialties
 - 6. 22 40 00 - Plumbing Fixtures
 - 7. 23 31 00 - Ducts and Accessories
 - 8. Division 26 - Electrical

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 RELATED WORK

- A. The building structure shall be designed to support the weight of the projects non-structural components, as well as related seismic and wind forces in accordance with ASCE/SEI 7.

1.05 REFERENCES

- A. Codes and Standards:
 - 1. Refer to Section 20 00 00 - Mechanical General Requirements for general Code and Standard references.
 - 2. ASCE/SEI 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- B. Abbreviations, Acronyms and Definitions:
 - 1. See Section 20 00 00 - Mechanical General Requirements and Section 26 00 00 - Electrical General Requirements for general abbreviations, acronyms, and definitions.
 - 2. See Mechanical and Electrical Drawings (Legend and Abbreviations).

3. Seismic Design Firm (SDF): A firm specializing in the design, manufacturing, testing and certification of vibration and seismic restraint systems (and their individual components) for attachment and support of building mechanical and electrical equipment and associated distribution systems. The SDF provides certification that its manufactured vibration and seismic restraint systems are seismically qualified for service by analysis, testing and/or experience data in accordance with ASCE/SEI 7, Chapter 13.
4. Seismic Design Firm Representative: Structural engineer regularly employed by the SDF. Proficient in the design and proper application of seismically qualified (certified) vibration and seismic control attachments and support systems for building mechanical and electrical equipment and distribution systems.
5. Seismic Design Engineer (SDE): Alaska licensed professional structural engineer with advanced formal education and training in structural engineering relating to seismic design. Responsible for the design, field certification and as-built drawing documentation of the project's vibration and seismic control design.
6. Project Structural Engineer: The project's structural design engineer of record.

1.06 SYSTEM DESCRIPTION AND CRITERIA

- A. Design Requirements:
 1. Provide vibration isolation and seismic control anchoring and support system products and application design and installation supervision services from a single pre-approved product manufacturer/Seismic Design Firm (SDF) and/or an Alaska licensed Structural Design Engineer serving as the SDE.
 2. Note that the project's structural design engineer of record may serve as the SDE.
 3. Provide the design to anchor, brace, and support the facility's non-structural components and associated distribution systems, including pre-engineered equipment, to the building's structure in accordance with ASCE/SEI 7 Chapter 13 (Seismic).
- B. Building Design Data: See Section 20 05 29 – Mechanical Hangers and Supports.
- C. Performance Requirements:
 1. Responsibilities of the SDF/SDE include:
 - a. Review the contract documents to determine the scope of the vibration and seismic control design for the project.
 - b. Work with the Contractor and provide recommendations regarding the physical routing of mechanical and electrical distribution systems to limit the need for additional seismic support. See ASCE/SEI 7, Section 13.6 Exceptions.
 - c. Define the mechanical and electrical components and distribution systems which will require vibration and seismic support to comply with ASCE/SEI 7.
 - d. Provide professional engineering seismic design force calculations, associated design drawings, details and selected products to be used to provide the necessary vibration isolation and/or seismic restraint at each required location.
 - e. Coordinate vibration and seismic design force conditions with Project Structural Engineer and incorporate adjustments necessary to avoid overstressing the building structure.
 - f. Submit vibration and seismic design for review by the Owner's Representative for approval.
 - g. Supply and deliver packaged vibration isolation and seismic restraint products with detailed installation instructions to the project site.
 - h. Provide onsite training to the Contractor to ensure the proper installation and performance of the project's vibration and seismic control systems.
 - i. Review MEP product submittals for products which include factory provided vibration isolation and/or seismic restraint component(s) for compliance with the seismic design. Provide written review comments.

- j. Provide field certification that the project's vibration isolation and seismic attachments and supports installation is complete and conforms to the approved vibration and seismic control design.

1.07 SUBMITTALS

- A. See Section 20 00 00 - General Mechanical Requirements and Section 26 00 00 - General Electrical Requirements for general submittal requirements.
- B. Submit Quality Assurance qualifications for:
 1. Seismic Design Firm (SDF).
 2. Seismic Design Engineer (SDE).
 3. Vibration isolation and seismic restraint product manufacturer.
 4. Mechanical, electrical, and plumbing trade installers.
 5. Contractor's Statement of Responsibility.
- C. Submit stamped engineering design for the project's vibration isolation and seismic design by a qualified, Alaska licensed professional structural engineer to include:
 1. Support and attachment (or anchoring) detail drawings for each application.
 2. Product selection, size, and installation configuration for each application.
 3. Seismic design force data, assumptions, and calculations for each application.
 4. Coordination requirements for topping slabs for embedded mechanical or electrical systems (e.g., radiant tubing, conduit, sensors).
 5. Include evidence of coordination with Project Structural Engineer.
- D. Submit vibration and seismic control design as a single submittal package. For larger projects, the vibration and seismic control submittal may be broken down into multiple smaller submittal packages, with each package covering a specific area of the building (e.g., Area A – First Floor, Penthouse Mechanical Room, etc.).
- E. Product Data:
 1. Annotated product catalog cutsheets and/or data sheets for the selected vibration isolation and seismic restraint products to be provided.
 2. Detailed schedules of flexible and rigidly mounted equipment, showing vibration isolators and restraints by referencing numbered descriptive drawings.
- F. For Seismic Design Categories C thru F:
 1. Life Safety Components: Submit approved agencies' Analytical or Shaker Test "Certificate of Compliance" certificates.
 2. Components Needed for the Continued Operation of the Facility: Submit approved agencies' Analytical or Shaker Test "Certificate of Compliance" certifications.
 3. Components Containing Hazardous or Flammable Materials: Submit approved agencies' Analytical or Shaker Test "Certificate of Compliance" certificates. Testing shall prove that no internal component will rupture to ensure against loss of hazardous or flammable (explosive) material which could support combustion, ignition or cause contamination.
 4. Use of historical data is permitted if evidence confirms historical based component having the same construction and weight with accompanying center of gravity as the submitted unit and basis of historical claim conforms to loads derived in testing with accompanying accelerations based on ICC-ES AC-156, "Acceptance Criteria for Seismic Certification by Shake-table Testing of Nonstructural Components."
 5. Components not listed and requiring only anchorage and load transfer compliance: The SDE shall submit stamped engineering calculations, drawings, and details to support the project specific equipment will accept anchorage through the component's load path to structure at its center of gravity, at the designated anchorage locations.
- G. Substitutions:
 1. The proposed substitution equipment manufacturer shall provide a letter certifying that the equipment's packaged or recommended vibration isolation and seismic restraint

methods comply with the requirements of this specification. Letters from field offices or representatives are not acceptable.

2. The cost associated with converting to the specified vibration isolation and/or seismic restraints method shall be borne by the Contractor in the event of non-compliance.
- H. Shop Drawings:
1. Submit floor plan shop drawings which include and identify the locations of:
 - a. Approved major mechanical and electrical system components.
 - b. Vibration isolated components and systems.
 - c. Mechanical and electrical distribution systems to include (as applicable):
 - 1). Piping and tubing systems.
 - 1). Ductwork systems and in-line components.
 - 3). Electrical conduit and cable trays.
 - 4). Bus Ducts.
 - 5). Plumbing.
 - 6). Pneumatic tube transport systems.
 - d. Identify building seismic joint locations and calculated displacement at each floor level.
 - e. Identify exempt components and distribution systems in accordance with ASCE/SEI 7 Chapter 13.
 - f. Identify vibration isolation and seismic control attachment and support locations with reference to applicable detail drawing(s).
- I. Quality Assurance/Control Submittals:
1. Contractor's Quality Assurance and Quality Control procedures for the administration and tracking of special inspections and testing.
 2. Design Data and Test Reports.
 3. Certificates and Manufacturer's Instructions.
 4. SDF qualifications and E&O insurance certificate.
 5. SDE professional license and seismic engineering qualifications.
 6. Authority Having Jurisdiction submittal review comments and final approval notification.
 7. Manufacturer's Field Reports.
 8. SDF and/or SDE certification of the correctness of completed installation.
- J. Installation, Operation and Maintenance (IO&M) Manual:
1. Provide a copy of the manufacturer's written installation, operation, and maintenance manual to include the following information:
 - a. Manufacturer's descriptive literature neatly annotated to clearly indicate information applicable to the equipment installed.
 - b. Certified seismic design calculations and installation details.
- K. Close-out Submittals:
1. Project record drawings: Annotate a clean copy of the project Contract Drawings to clearly indicate the actual installation location of each vibration and seismic restraint device type and keyed to the appropriate installation detail.
 2. Provide a certificate from the Manufacturer's Representative indicating that the vibration and seismic restraint systems of the facility are installed and operational as designed.

1.08 QUALITY ASSURANCE

- A. Manufacturer qualifications: Company specializing in manufacturing and testing of vibration and seismic control systems and components with a minimum of five (5) years documented experience.
- B. Installer qualifications: Minimum 5 years' experience in the installation of specialized vibration and seismic control systems.

- C. SDF qualifications: Minimum 5 years' experience in the design, selection, and inspection of specialized seismic control systems for facilities with similar occupancies and seismic criteria and acceptable to the Authority Having Jurisdiction.
- D. SDE qualifications: Minimum 5 years documented seismic engineering experience and acceptable to the Authority Having Jurisdiction.
- E. Errors and Omissions Insurance Certificate:
 - 1. Submit copy of the SDF/SDE E&O Insurance Certificate.
 - 2. Product liability insurance certificates are not acceptable.
- F. Pre-Installation Meetings:
 - 1. Conduct a coordination meeting prior to the installation of vibration isolation and seismic restraint equipment.
 - 2. Discuss the equipment and systems affected by this Section and the method to be used to coordinate the installation and inspection of vibration isolation and seismic restraint equipment.
 - 3. Conduct additional meetings as required to coordinate the work.
 - 4. The meeting will be attended by:
 - a. The Contractor.
 - b. Contractor's Commissioning Representative (if applicable).
 - c. Trade foremen for the systems affected by the work.
 - d. The SDF representative.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. See Section 20 00 00 - Mechanical General Requirements.

1.10 WARRANTY

- A. See Section 20 00 00 - Mechanical General Requirements.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Seismic Design Firms (SDF):
 - 1. ISAT/Kinetics Noise Control.
 - 2. Mason Industries.
 - 3. VMC Group.
 - 4. Approved equal.
- B. Vibration Isolation and Seismic Restraint Products:
 - 1. ISAT (Seismic Restraint).
 - 2. Kinetics Noise Control (Vibration Isolation).
 - 3. Mason Industries.
 - 4. VMC Group.
 - 5. Hilti.
 - 6. Unistrut, Tyco International.
 - 7. Approved equal.

2.02 FINISHES

- A. Product finishes for corrosion protection:
 - 1. Exposed steel to be stainless steel, galvanized, or finished with dry powder coating.
 - 2. Hardware: Zinc electroplated, galvanized, or stainless steel.
 - 3. Hardware in contact with concrete and surfaces subject to liquids shall be stainless steel.
 - 4. Springs and housings shall be powder coated.

- B. In public areas, exposed support systems and elements shall be painted, excluding dynamic assemblies which shall have manufacturer's coating:
 - 1. Clean and prepare pipe, fittings, hangers, restraints, supports, and miscellaneous items for areas to be painted.
 - 2. Refer to the requirements specified in Division 9.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Visually inspect appliances, equipment and distribution systems requiring vibration isolation and/or seismic restraint for installation location tolerance, interference and other conditions affecting installation.
- B. Verify actual locations of cast-in-place anchors, structure reinforcements and other required attachments prior to installation.
- C. Document and correct deficiencies or submit proposed design modifications for approval prior to the installation.
- D. Note if Project contains cast in place radiant floor heating tubing. Coordinate slab penetration locations so as to not damage tubing.

3.02 INSTALLATION

- A. When possible, and without compromising distribution system performance or maintenance/replacement accessibility, route distribution systems such as to limit the extent of seismic support required in accordance with ASCE/SEI 7 Chapter 13, Section 13.6 Exemptions.
- B. When the exemption requirements of ASCE/SEI 7 cannot be met, provide vibration isolation and seismic restraint in accordance with the applicable sections of Section 13.6. and the following:
 - 1. Install seismic control systems in compliance with the approved seismic design drawings and details and approved product manufacturer's written instruction instructions.
 - 2. Install seismic control so as not to stress or misalign equipment, piping, or ductwork.
 - 3. Provide flexible connections for piping, ductwork, and conduit connections to vibration isolated equipment.
 - 4. Do not install rigid connections directly between vibration isolated equipment and the building structure.
 - 5. Seismic restraint systems shall not interfere with installation or maintenance access to other building systems.
 - 6. Install seismic cable assemblies taut on non-vibration isolated systems.
 - 7. Install seismic cable assemblies with a slight amount of slack for vibration isolated systems to avoid sound shorts.
 - 8. Seismic single arm braces may be used in place of cables on rigidly attached systems and in place of cables on isolated systems when resilient bushings are used.
 - 9. Conduct Special and Periodic Inspections in accordance with FIELD QUALITY CONTROL article requirements.

3.03 SEISMIC JOINTS

- A. When possible, limit the crossing of building seismic joints with distribution systems.
- B. When crossing a seismic joint cannot be avoided, install flexible connections in distribution systems at the seismic joint which exceed the maximum design seismic joint deflection. See Structural drawings for calculated seismic joint deflections.
- C. Use $I_p = 1.5$ without exception to accommodate displacements across seismic joints for ductwork.

3.04 INSTALLATION OF EQUIPMENT

- A. Install indoor floor mounted equipment on raised reinforced concrete housekeeping pads. Extend pads beyond equipment base rails/floor mounting plates equally in all directions to meet seismic anchor embedment requirements. See Section 15 05 29 - Mechanical Hangers and Supports for detailed housekeeping pad requirements.
- B. Install exterior equipment on crowned reinforced concrete equipment pads. Extend pads beyond equipment base rails/floor mounting plates equally in all directions to meet seismic anchor embedment requirements.
- C. Install pump and other equipment bases into position, at normal vibration isolator operating height, using temporarily support blocks or shims prior to the installation of the equipment, isolators, and seismic restraints.
 - 1. After the installation, and under full load (e.g., equipment filled with operating fluid), adjust isolators to transfer load from the temporary blocks to the isolators.
 - 2. Next, remove temporary blocks, shims, and debris from beneath the equipment and verify no vibrational "short circuits" exist.
 - 3. Confirm equipment is free to move in all directions, within the limits of the seismic snubbers (maximum 0.25 inches).
 - 4. Minimum operating clearance between top of housekeeping pad and underside of isolator mounted equipment is 2 inches.
- D. Protect air handling equipment and centrifugal fans from excessive displacement resulting from air thrust in relation to equipment weight. Provide horizontal thrust restraints if horizontal motion exceeds 3/8 inch.
- E. Provide earthquake ceiling clips or other approved means of positive attachment of ceiling mounted diffusers and lighting fixtures (less than 75 pounds) to the ceilings T-bar support grid. Where ceilings are not braced, provide lay-in lighting fixtures with 4 independent corner diagonal wire ties to structure.

3.05 CONSTRUCTION

- A. Interface with other Work:
 - 1. Coordinate and sequence installation of vibration and seismic control supports and bracing with trades responsible for portions of this and other related portions of the Work.
 - 2. Rework required as a result of failure to follow the manufacturer's written installation instructions or to properly coordinate with related Work shall be completed at no additional expense to the Owner.
 - 3. Coordinate and schedule special inspections related to systems under this specification section.

3.06 REPAIR/RESTORATION

- A. Repair product components broken during installation or startup with replacement parts supplied by the product manufacturer.
- B. Substitute replacement parts from other manufacturers are not acceptable.

3.07 FIELD QUALITY CONTROL

- A. Special Inspections:
 - 1. Perform Independent Special and Periodic Inspections with written reports of findings of the seismic restraint systems serving nonstructural MEP system components at the expense of the Owner.
 - 2. Special Periodic Inspections: See IBC Section 1705.13.6 for minimum inspection requirements.

3. Submit special inspection written reports a maximum of 2 working days following site inspection.
- B. Manufacturer's Field Services:
1. Upon completion of installation of vibration isolation and seismic restraint devices and systems, the SDF's representative shall inspect the completed project and certify in writing to the Contractor that systems are installed properly or provide detailed corrective action as required.
 2. If corrections are required, additional inspections shall be completed by the SDF's representative until all the work is certified to be installed properly.
 3. The Contractor shall submit a report to the Owner which includes the SDF's representative letter certifying correctness of the installation.

3.08 CLEANING

- A. Upon completion of installation, remove construction debris from around seismically restrained components to allow free motion in all directions within the limits of the seismic restraining devices.

3.09 EQUIPMENT STARTUP

- A. Prior to equipment startup, remove shipping restraints from vibration isolators and adjust in accordance with the applicable manufacturers written operating instructions.
- B. During start-up, with attached piping systems filled (as applicable), verify proper vibration isolator active spring heights and snubber offsets.
- C. Adjust vibration isolators and seismic restraints during equipment operation to allow normal movement and minimize the transmission of equipment sound and vibration through the building structure and attached distribution systems.

END OF SECTION

MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Equipment Nameplates.
 - 2. Valve Tags.
 - 3. Pipe Identification.
 - 4. Ceiling Markers.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 22 11 00 - Domestic Water Piping and Specialties
 - 3. 22 13 00 - Sanitary Waste and Vent Piping and Specialties
 - 4. 23 31 00 - Ducts and Accessories

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Codes and Standards:
 - 1. See Section 20 00 00 - Mechanical General Requirements.
 - 2. ANSI/ASME A13.1-2015 (American Society of Mechanical Engineers) - Scheme for the Identification of Piping Systems.
 - 3. ANSI Z535.1-2017 - Safety Colors.
- B. Abbreviations, Acronyms and Definitions:
 - 1. Refer to Division 1 for general abbreviations, acronyms, and definitions.
 - 2. Refer to Section 20 00 00 - Mechanical General Requirements for general mechanical related definitions.
 - 3. Refer to Mechanical Drawings legend sheet for general mechanical related abbreviations.

1.05 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Provide equipment nameplates, valve tags and labels for the mechanical systems

provided under this contract.

2. Provide labels for piping. Paint exposed piping and pipe insulation in utility and mechanical rooms.

1.06 SUBMITTALS

- A. Refer to Section 20 00 00 - Mechanical General Requirements for general submittal requirements for the items listed below, supplemented with the additional requirements listed.
- B. Product Data:
 1. Master Schedule of Equipment:
 - a. Submit master schedule of equipment, components, and systems that will be tagged and labeled for the project.
 - b. Include the proposed method of labeling to be implemented (nameplate, tag, label/marker, etc.), legend ("Domestic Cold Water," "PMP-1," etc.) and letter/background colors.
 - c. Match legend to Contract Document legend, abbreviations, and schedule symbols. Use standard mechanical identification products when available.
- C. Installation, Operation and Maintenance (IO&M) Manuals: Provide completed, typed "Master Schedule of Equipment."

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Marking Services Incorporated (MSI).
- B. Seton Identification Products.
- C. Craftmark.
- D. Approved equal.

2.02 VALVE TAGS

- A. General:
 1. Small equipment, such as in-line pumps may be identified with tags in lieu of nameplates if inadequate room is available.
 2. Provide service indicator on top line of tag, using system abbreviations provided in Part 3 Pipe Identification Table.
 3. Provide valve number on bottom line of tag. Start valve numbering with "001" for each legend series/service indicator. Assign valve numbers in a logical sequence from the source (i.e., service water entry point, gas meter service isolation) or heat source (boiler or water heater supply) and continue numbering outward to the most remote terminal connection point.
- B. Plastic Engraved Tags:
 1. Round, 1-1/2 inches diameter, engraved plastic.
 2. Text stamped and filled black:
 - a. 1/4 inch service indicator on top.
 - b. 1/2 inch valve number below.
 3. Beaded chain tag fasteners.
 4. Provide tag color coding to match pipe marker coding or as designated by the Contracting Agency.

- C. Brass Stamped Tags:
 - 1. Round, 1-1/2 inches diameter, brass with smooth edges.
 - 2. Text stamped and filled black:
 - a. 1/4 inch service indicator on top.
 - b. 1/2 inch valve number below.
 - 3. Beaded chain tag fasteners.

2.03 PIPE IDENTIFICATION, MARKING

- A. Identify both service and flow direction.
- B. Colors and Lettering: Conform to ANSI/ASME A13.1; see tables under Article 3.2E below.
- C. Plastic Pipe Labels:
 - 1. Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering.
 - 2. Larger sizes may have maximum sheet size with plastic nylon ties or straps.
- D. Plastic Tape Pipe Labels: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

2.04 CEILING MARKERS

- A. Description:
 - 1. 7/8-inch diameter, color-coded.
 - 2. Metal push tacks or 0.030" rigid vinyl, pressure sensitive stickers.
- B. Color code as follows:
 - 1. HVAC equipment: Yellow.
 - 2. Plumbing valves: Green.
 - 3. Non potable water and wastewater valves: Orange.
 - 4. Heating valves: Blue.
 - 5. Fire suppression valves and drains: Red.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to directly receive adhesive labels.
- B. Install identifying devices after completion of coverings and painting.

3.02 INSTALLATION

- A. Do not install identifying devices over factory installed equipment labels.
- B. Locate identifying devices in clear view for simple identification.
- C. Tag automatic controls, instruments, and relays. Key these to control system schematic drawings.
- D. Pipe Identification:
 - 1. Identify piping, concealed or exposed, using ANSI A13.1 compliant pipe labels. Identify both service and flow direction in accordance with the following table.

MECHANICAL IDENTIFICATION

Division 20

Section 20 05 53

Abbreviation	Legend	Color (Letters/Background)
CW	Domestic Cold Water	White/Green
HW	Domestic Hot Water	White/Green
HWC	Domestic Hot Water Circulation	White/Green
HWS	Heating Water Supply	White/Green
HWR	Heating Water Return	White/Green
W	Sanitary Drain	White/Green
V	Sanitary Vent	White/Green
RL, ORL	Rain Leader, Overflow Rain Leader	White/Green
SD	Storm Drain	White/Green
FW	Fire Suppression Water	White/Red

2. Pipe label letters shall be a minimum of 1/2" high and increase with pipe diameter as follows:

3.	Pipe Outside Diameter	4.	Letter Height
5.	0.75" to 1.25"	6.	0.5"
7.	1.5" to 2"	8.	0.75"
9.	2.5" to 6"	10.	1.25"
11.	8" to 10"	12.	2.5"
13.	over 10"	14.	3.5"

15. Install labels in unobstructed view and aligned with horizontal or vertical axis of piping as appropriate. For piping located above the normal line of vision, place labels below the horizontal centerline of the pipe for clear unobstructed view from below.
16. Install labels not to exceed 20 foot intervals along straight piping runs (including risers and drops), close to valves, adjacent to changes in direction and branches, on each side of pipe penetrations through walls or floors, and at each access panel.

END OF SECTION

MECHANICAL INSULATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Specific requirements, products and methods of execution which relate to the insulation of ducts, fittings, pipes, and other surfaces of the mechanical installation.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 22 11 00 - Domestic Water Piping and Specialties
 - 3. 22 13 00 - Sanitary Waste and Vent Piping and Specialties
 - 4. 22 40 00 - Plumbing Fixtures
 - 5. 23 21 13 - Hydronic Piping and Specialties
 - 6. 23 31 00 - Ducts and Accessories

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. See Section 20 00 00 - Mechanical General Requirements.
- B. ASHRAE 90.1 - 2010 Energy Standard for Buildings Except Low-Rise Residential Buildings.
- C. MSS Standard Practice SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation.

1.05 DESCRIPTION

- A. Provide thermal insulation for ventilation system ductwork and building service piping.
- B. Provide insulation for exposed ADA plumbing fixture piping.

1.06 PRE-INSTALLATION MEETINGS

- A. See Section 20 00 00 - Mechanical General Requirements.

1.07 SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements for general submittal requirements for the items listed below, supplemented with the additional requirements listed.

- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Qualifications: Submit manufacturer and Applicator qualifications.

1.08 QUALITY ASSURANCE

- A. See Section 20 00 00 - Mechanical General Requirements.

1.09 DELIVERY, STORAGE AND HANDLING

- A. See Section 20 00 00 - Mechanical General Requirements.
- B. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.10 WARRANTY

- A. See Section 20 00 00 - Mechanical General Requirements.

PART 2 - PRODUCTS

2.01 FIRE RATING OF MATERIALS

- A. Provide insulation products used aboveground in building with burning characteristics in compliance with NFPA Standards 90A and 90B: Flame Spread 25, Fuel Contributed 50, Smoke Developed 50. Tested according to UL 723, ASTM E84, or NFPA 255. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
- B. Insulation specified for use underground and aboveground away from the building might have other burning characteristics. Use such products only where specifically required.

2.02 FIBERGLASS INSULATION

- A. Piping: Provide insulation products as follows:
 - 1. Thermal conductivity K equals 0.24 at 100 degrees F mean temperature, ASTM C335.
 - 2. Factory applied vapor-barrier, flame retardant all service jacket and tape, with permeability rating equal to 0.02 perms, ASTM E 96.
 - 3. Temperature limits for fiberglass pipe insulation: 350 degrees F, unless otherwise indicated.
 - 4. Manufacturers: Johns Manville, Owens Corning, Knauf Fiber Glass, or approved equal.
- B. Ductwork: Provide insulation products as follows:
 - 1. Flexible insulation: Average thermal conductivity K equals 0.24 at 75 degrees F mean temperature at 1.5 pounds per cubic feet (PCF) density, ASTM C335.
 - 2. Rigid insulation: Average thermal conductivity K equals 0.24 at 75 degrees F mean temperature at 3.0 PCF density, ASTM C518.
 - 3. Factory-applied vapor barrier flame-retardant Foil-Scrim-Kraft (FSK) or all-service jacket and tape, with permeability rating equal to 0.02 perms, ASTM E 96.
 - 4. Temperature limits for fiberglass duct insulation: 250 degrees F unless otherwise indicated.
 - 5. Manufacturers: Johns Manville, Owens Corning, Certainteed, Knauf Fiber Glass, or approved equal.

2.03 FLEXIBLE ELASTOMERIC FOAM INSULATION

- A. Thermal Conductivity: 0.27.
- B. Water Vapor Transmission: 0.08.

- C. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Grade 1, Type I for tubular materials.
 - 1. AP ArmaFlex or AP ArmaFlex Black LapSeal (basis of design).
 - 2. Aeroflex USA, Inc.
 - 3. K-Flex USA.
 - 4. Approved equal.

2.04 FIXTURE INSULATION ASSEMBLY

- A. Protective, molded, fire-resistant foam insulation, single piece insulation manufactured specifically for plumbing fixture supplies and drains.
- B. 4.5 PCF foam with insulation R factor 2, white fire retardant polyurethane integral skin, twist fasteners.
- C. Manufacturer: Skal+Gard, Model SG-100B, TCI Products, or approved equal.

2.05 CANVAS JACKETING

- A. Insulating Lagging Canvas: Eight ounces per square yard minimum, fire-retardant material complying with fire ratings specified above. Manufacturer: Chas Harmon "Osnaberg", Claremont Company Inc., "Claretex", or approved equal.
- B. Lagging Adhesive: Plastic synthetic resin emulsion adhesive; watertight, mildew resistant, fire retardant. Manufacturer: Childers Chil-Perm CP, Foster® Sealfas® coating 30-36, or approved equal.

2.06 METAL JACKETING

- A. 27 gauge (U.S. Standard) heavy corrugated aluminum.
- B. Preformed fitting covers.

2.07 COATINGS

- A. Coatings: UL labeled.
- B. On cold or dual service lines, use vapor barrier type coatings.

2.08 PREFORMED FITTING COVERS

- A. One-piece pre-molded PVC jacketing and fitting covers specifically designed for the service intended.
- B. Install per manufacturer's instructions and secure with manufacturer's color matching PVC tape.
- C. Manufacturer: J-M "Zeston", TeeCee, Proto, Certainteed.

PART 3 - EXECUTION

3.01 GENERAL

- A. Do not apply insulation materials until surfaces to be covered are clean and dry and foreign material such as rust, dirt, etc. is removed. Keep insulation clean and dry during installation and during the application of any finish.
- B. Do not install the insulation on pipe fittings and pipe joints until the piping has been tested and approved.
- C. Do not install the insulation on ducts or fittings until the ductwork has been tested and approved.
- D. Do not apply under conditions of excessive humidity or at temperatures below 50 degrees F or

above 100 degrees F.

- E. Provide insulation support blocks, shields, and transitions for hangers, supports, anchors, and guides. Coordinate insulation requirements through rated assemblies and Listing penetration's requirements.
- F. Adjust hangers, guides, anchors, and supports after insulation installation has been approved.

3.02 PIPE INSULATION

- A. Cold Piping:
 - 1. Includes domestic cold water, plumbing, and vents through roof, and other cold piping to zero degrees F.
 - a. Insulate plumbing vents from three feet below the under deck of the roof to the termination above the roofline.
 - 2. Insulate with sectional fiberglass insulation and provide a completely sealed vapor barrier. Provide insulation thickness per Insulation Thickness Table.
- B. Hot Piping:
 - 1. Includes domestic hot water supply and recirculation, and hydronic heating.
 - 2. Insulate with sectional fiberglass. Provide insulation thickness per Insulation Thickness Table.
- C. In addition to specified jackets, provide heavy corrugated aluminum jacket on piping insulation anywhere piping is exposed below nine feet zero inches above floor in public areas.
- D. Insulation Thickness Table (units are in inches):

Fluid Design Operating Temperature Range	Less than 1	1 to <1-1/2	1-1/2 to <4	4 to <8	8 and up
Heating Systems (Water and Glycol Solutions) and Domestic (Hot Water and Hot Water Circulation):					
141 °F to 200 °F	1.5	1.5	2	2	2
105 °F to 140 °F	1.5	1.5	2	2	2
Domestic Cold Water:					
All	1	1	1.5	1.5	1.5
Plumbing vents through roof:					
All	1	1	1.5	1.5	1.5

3.03 TECHNIQUE FOR APPLICATION TO PIPES

- A. Close longitudinal joints of pipe insulation firmly and butt insulation sections firmly together. Neatly and smoothly adhere laps and butt strips.
- B. Clean the contact area on jacket for adhesive lap strips and butt strips so it is free from fingerprints, oil, construction dust and other contaminants. Clean surfaces with tack rags, methanol, or other suitable agent before attempting to adhere the strip. Apply pressure to adhesive strip with suitable tool immediately after adhering. Remove insulation with inadequately sealed joints and install new sections. Outwardly clinching staples may be used to reinforce joints.
- C. Continuously seal vapor barriers. If staples are used at laps, seal the entire length of stapled lap with adhesive jacket tape applied as specified above for laps and butts. Sectionalize vapor barrier by sealing ends of insulation sections at not more than 25 feet intervals, to prevent moisture migrating lengthwise. Apply butt strips over joint as above.
- D. Provide double insulation thickness on piping in outside walls and within five feet of vehicle

doors or other large openings.

- E. Except as indicated, locate pipe hangers and rollers outside insulation. Provide insulation saddles or sheet metal shields around insulation. On pipes two inches and larger, within the area of each insulation shield, use calcium silicate or cellular glass on the lower half of the insulation, equal in thickness to adjacent insulation.
- F. Where piping is installed outdoors, provide two-layer glass cloth and four-layer weatherproof vapor barrier adhesive coating, in addition to jacket specified.

3.04 TECHNIQUE FOR APPLICATION TO PIPE FITTINGS AND VALVES

- A. Insulate fittings to the same thickness as the pipe insulation.
- B. Any of the following methods of insulation are acceptable:
 - 1. Blanket Wrap: Wrap the fitting with compressed glass fiber blanket. Wire the blanket securely in place and cover with a smooth layer of insulating/finishing cement. Cover with glass mesh tape, adhering it with an adhesive coating.
 - 2. Fabricated Segments: Cut mitered segments from pipe insulation that has the same wall thickness as adjacent pipe insulation to form a cover which will fit snugly around the fitting. Wire the segments firmly in place and seal the joints with insulating/finishing cement. Apply adhesive coating and wrap with glass mesh tape, then apply another layer of the same coating over the whole assembly.
- C. In each of the listed methods, to protect the insulation against contact damage, apply an adhesive coating when the cement is completely dry and hard, then wrap with glass mesh tape. Apply another coating of adhesive over the whole assembly.
- D. In each of the listed methods, pre-formed fitting covers may be substituted for the tape and adhesive covering specified. Cement and tape fitting covers on cold piping to provide a positive vapor barrier.
- E. Removable insulation blankets of comparable insulation value for valves and where equipment require frequent adjustments or maintenance shall be provided; identify and coordinate during submittal process.
- F. After insulation has been installed adjust hangers for proper fit, maintain pipe grade and support.

3.05 DUCT THERMAL INSULATION REQUIREMENTS

- A. Insulate ductwork as follows:
 - 1. Insulate outside air intake ducts from air intake louver connection to equipment connections (including insulated isolation damper frame) with 2-inch rigid or semi-rigid board insulation.
 - 2. Insulate exhaust and relief ducts from point of discharge to and including back draft damper support frame with two inch rigid or semi-rigid board insulation.
- B. Insulation Type and Finish:
 - 1. Rigid or semi-rigid board where canvas or metal jacket is specified. May also be used in place of blanket insulation where practical.
 - 2. Blanket insulation where rigid board is not specified or indicated. Proper installation is critical. Loose joints and sagging insulation shall require re-insulation of entire branch or main duct before acceptance and during warranty period.
 - 3. Fiberglass or canvas jacket over board insulation in mechanical and boiler rooms less than 10 feet above finish floor, where exposed in finished rooms and where indicated. Seal jacket with vapor barrier lagging adhesive.
 - 4. Ductwork insulation to have a completely sealed vapor barrier, except segmental insulation on medium/high velocity trunk ducts and warm air ducts in concealed spaces, where approved.

3.06 DUCT SOUND INSULATION REQUIREMENTS

- A. Refer to Section 23 31 00 - Ducts and Accessories.
- B. Install where shown.
- C. Install in accordance with manufacturers installation instructions. Completed installation shall be fastened tightly to ductwork and free of sags.

3.07 TECHNIQUE FOR APPLICATION TO DUCTWORK

- A. Rigid and Semi-rigid Insulation:
 - 1. Impaling Over Pins: Install insulation with edges tightly butted using adhesive and metal pins. Impale insulation on pins welded to the duct and secure with speed clips. Trim off pins close to speed clip. Space pins as required to hold insulation firmly against duct surface but not less than one pin per square foot.
 - 2. Other Method of Securement: If the welded pin method is not feasible, secure the insulation to the duct with adhesive. Cover the entire surface of the metal with adhesive when applying to the underside of horizontal ducts. Application to top and sides may be in strips with a minimum of 50 percent coverage. Additionally, secure insulation with No. 16 galvanized wire on not more than 12 inches on center. Provide metal angle at corners to protect edges of insulation.
 - 3. Vapor Barrier: Seal joints and speed clips with adhesive tape of similar construction to insulation jacket. Thoroughly clean contact surfaces for adhesive as specified under pipe insulation technique. Glass cloth tape set in adhesive may be used. Provide metal or plastic corner angles within eight feet of floor, walkway, or stairs.
 - 4. Provide fiberglass or canvas jacket where specified. Completely cover with minimum 1/8" lagging adhesive. Cover canvas with two heavy coats of same adhesive and completely fill the weave. Inspect when dry for complete vapor barrier throughout and refinish as required.
- B. Blanket Insulation:
 - 1. Position insulation so that longitudinal seam will be underneath and not supporting weight of sheet. Remove a uniform strip of insulation from backing to provide a lap strip. Butt insulation and secure lap strip with outwardly clinching staples.
 - 2. Use pins to secure blanket on large flat areas as specified for rigid insulation. Reinforce jacket at pin penetration where required.
 - 3. Seal laps, staples and butt joints with adhesive tape of similar construction to insulation jacket. Seal speed clips if used. Thoroughly clean contact surfaces for adhesive as specified under pipe insulation technique.
 - 4. When system is under pressure, inspect insulation for inflation caused by improperly sealed ducts. Repair duct seal and reinsulate as necessary.
 - 5. The Contracting Agency may inspect completed insulation and test taped joints for adhesion. Seal laps and butt tapes that can be removed with reasonable force shall require that entire branch or trunk duct be reinsulated.

3.08 FIXTURE INSULATION ASSEMBLY

- A. Insulate cold and hot water supply and waste piping exposed beneath sink and lavatory fixtures designated on drawings or specified in Section 22 4000 - Plumbing Fixtures, as intended for use by disabled persons. Install in accordance with ANSI A117.1 - 2009.

END OF SECTION

WATER BASED FIRE SUPPRESSION SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes performance requirements, products, and methods of execution relating to fire suppression for the project. The contract documents have performance, materials, and installation requirements which exceed code and standard minimums. This Section is substantially a “performance” specification.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 28 31 00 - Addressable Fire Alarm

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Provide fire suppression in accordance with the provisions of the following codes and standards:
 - 1. International Fire Code – 2018, IFC.
 - 2. International Mechanical Code – 2018, IMC.
 - 3. International Building Code – 2018, IBC.
 - 4. Uniform Plumbing Code – 2018, UPC.
 - 5. NFPA 13 – 2016, Standard for the Installation of Sprinkler Systems.
 - 6. NFPA 25 – 2017, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.
 - 7. NFPA 70 – 2017, National Electric Code, NEC.
 - 8. NFPA 72 – 2019, National Fire Alarm and Signaling Code.
 - 9. ASCE 7 – 16, Minimum Design Loads and Associated Criteria for Building and Other Structures.
 - 10. Underwriters Laboratories, UL, Fire Protection Equipment Directory.
 - 11. Factory Mutual Research Corporation, FMRC, Approval Guide.
 - 12. Factory Mutual Global, FMG, Property Loss Prevention Data Sheets.
 - 13. Municipality of Anchorage Fire Department, Fire Prevention, Policy #08-014 Permitting Requirements for Fire Systems.
- B. Standards: Reference to the following standards infers that installation, equipment and

material shall be within the limits for which it was designed, tested and approved, in conformance with the current publications and standards of the following organizations:

1. American National Standards Institute - ANSI.
2. American Society of Heating Refrigerating and Air Conditioning Engineers - ASHRAE.
3. American Society of Mechanical Engineers - ASME.
4. American Society for Testing and Materials - ASTM.
5. National Electrical Manufacturers' Association - NEMA.
6. National Fire Protection Association - NFPA.

1.05 SYSTEM DESCRIPTION

- A. Provide a complete fire suppression system fully operational in accordance with the contract documents and the applicable codes and standards, as well as Authority Having Jurisdiction (AHJ) requirements to protect the school. The contract documents have performance, materials, and installation requirements which exceed code minimums. Work includes connection to existing fire water piping mains, two new sprinkler risers in separate locations to provide complete sprinkler coverage for the school's academic area, including any built-in display cabinets and dry sidewall heads for outdoor entrance canopies, and other items as required. Work includes installation of heads in finished ceilings.
- B. This is a Factory Mutual Global, FMG, protected property. FMG density and areas shall be used for hydraulic calculations, including room method if criteria meets or exceeds NFPA 13 hydraulic requirements.
- C. Provide seismic anchoring, bracing, supports, and clearance for equipment, pipes and sprinkler heads per NFPA 13, International Building Code, FMG, and ASCE 7; most conservative criteria shall govern. Provide for differential movement at building seismic joints, see architectural and structural requirements. Provide labor, materials, and equipment as required to test sprinkler system as required per NFPA 25. Test shall be coordinate with Contracting Agency for specific systems and areas.
- E. Provide listed sprinkler flex hose for sprinkler heads in suspended ceiling assemblies. Other methods to maintain required clearances are not allowed.
- F. Provide provisions including isolation valves and fittings for inspection, testing, and maintenance of water-based fire protection systems identified in NFPA 13 and NFPA 25.
- G. Provide a test valve assembly at the hydraulic remote area to equal the required flow of one or more sprinklers head. Wet pipe systems may be reduced to one sprinkler head.
- H. Work includes complete installation of pipes and sprinklers in many types of spaces and finished ceilings, architectural features, and building lines. Route pipes above ceilings where possible. Exposed pipes shall follow architectural elements/building lines for visual and symmetric appearance. Design and installation of sprinkler systems shall incorporate aesthetic review comments including: routing and concealment of lines, exposed pipe, sprinkler head finish and locations, and exterior penetrations.

1.06 SUBMITTALS

- A. Submittals shall be complete for review. Drawings, calculations, and product cutsheets shall be complete and submitted together in one package. See Section 20 00 00 - General Mechanical Requirements for additional requirements not covered below.
- B. Submittal review is for general design and arrangement only and does not relieve the Contractor from any of the requirements of the Contract Documents.
 1. Submittals will not be checked for quantity, dimension, fit, or for proper technical design of manufactured equipment.
 2. Providing a complete and satisfactory working installation is the responsibility of the Contractor.
 3. Product data, shop drawings, and calculations shall be submitted together for review.

Partial submittals will not be reviewed.

C. Electronic Submittals:

1. Provide electronic submittal in PDF format in addition to hard copy submittal.
2. Electronic submittals shall follow the organization and formatting required for paper submittals.
3. Provide electronic bookmarks within the PDF document in place of tabs and sub-tabs.
4. If individual PDF files are provided for each product or shop drawing sheet, organize files into folders and name files and folders to correspond with applicable specification sections or drawing titles.
5. PFD documents to be without security and be searchable and copied and pasted. For scanned documents, run the optical character recognition (OCR) function to ensure the document is searchable and can be copied and pasted.
6. Reduce PDF file size by removing data and file creation elements not needed for final file presentation.

D. Product Data:

1. Submit product data for items specified in Part 2 and those products required by the performance standards of this Section. Identify catalog designation and/or model number and neatly annotate each salient characteristic and design option of the product. Identify operation characteristics, performance curves and rated capacities of products and devices to show compliance with shop drawings and calculations.
2. Provide exterior and interior signage with placement locations indicated on shop drawings.
3. Provide data on firestopped penetrations, including product being submitted, the rating of the assembly it will be used for, and the applicable Through Penetration Firestop System drawing(s) from the UL Fire Resistance Directory.

E. Shop Drawings:

1. Submit Authority Having Jurisdiction approved sets of shop drawings and calculations. Drawings and calculations shall include the NICET certification and State of Alaska Permit IIC or IIC-DO number and signature, or signed seal of a licensed professional engineer, and the fire suppression Contractor's Alaska specialty license number.
2. Shop drawings shall be submitted with information in compliance with NFPA 13 and other performance standards of this Section. Shop drawings shall include but not limited to the following that are applicable to the project:
 - a. Name of Contracting Agency, Occupant and Building Permit number.
 - b. Location, including street address and legal description.
 - c. Point of compass.
 - d. Fire Department connections.
 - e. Necessary controlling equipment.
 - f. Location of water source, type, routing, depth of bury, and size of supply pipes. Identify location and size of city main and whether it is dead-end or circulating loop and distance to the flow data test hydrant.
 - g. Distribution system pipes and outlets. Include pipe and fitting types.
 - h. Sprinkler connection, drop, details including supports required for flex pipe.
 - i. Supports, brackets, restraints, and seismic attachments details and schedules.
 - j. Reflected ceiling plan showing ceiling heights, construction type, proposed location and type of sprinkler heads, and other ceiling devices such as HVAC diffusers, loud speakers, type and location of light fixtures, etc.
 - k. Interference control between sprinkler system and other trades.
 - l. Full height cross section, indicating basic building construction system, sprinkler piping arrangement, and elevation of the highest sprinkler head.
 - m. Location of partitions. Identification of full height walls and draft stops.
 - n. Location and size of unprotected concealed spaces.

- o. Location of unheated areas and areas that cannot be reliably maintained above 40 degrees F.
 - p. Water flow test results: Include testing agency, time, date, and location of test.
 - q. Make, model, type, orifice, finish, color, and temperature rating of sprinklers and their respective locations.
 - r. Sprinklers with sprinkler guards.
 - s. Extended coverage sprinklers.
 - t. Corrosion resistant sprinklers.
 - u. Ceiling slopes greater than 2 to 12.
 - v. Each hydraulic remote area and associated calculations with hazard type and density.
 - w. Hydraulic node points.
 - x. The square footage area protected by each system.
 - y. Make, model, and size of valves and equipment, including control valves, alarm valves, check valves, hose valves, and related appurtenances.
 - z. Drum drip drains, main drain, low point drains, drain receptors, and inspector test stations.
 - aa. The type and location of pipe hangers, equipment supports, seismic movement, and seismic restraints.
 - bb. Building seismic joints and displacement at each level.
 - cc. Make, model, size, and locations of pipe couplings, fittings, and flanges.
 - dd. Make, model, size, power requirement, and location of alarm bells, buzzers, detectors, switches, air compressors, and panels.
 - ee. Provisions for flushing and backflow device system demand forward flow test and test discharge to safe location.
 - ff. Name, address, and telephone number of the fire protection specialty Contractor. If design is by a separate firm, include the name address, telephone and fax numbers, and email of the design firm.
 - gg. Legend of abbreviations and symbols indicated.
 - hh. Schedule of room occupancies.
 - ii. Location of structural penetrations and verification that structural penetrations have been coordinated and approved.
 - jj. Note the size, location, and extent of "exposed" pipes.
 - kk. Location of fire rated assemblies.
- F. Design Data:
1. Submit Authority Having Jurisdiction approved sets of calculations. Drawings and calculations shall include the NICET certification and State of Alaska Permit IIC or IIC-DO number and signature or stamp of a licensed professional engineer and the fire suppression Contractor's Alaska specialty license number. Submit complete hydraulic calculations which were used to prepare the final design drawings. One set will be retained by the Engineer.
 2. Product data, shop drawings, and calculations shall be submitted together for review; partial submittals not allowed.
 3. Systems shall be limited to a maximum of 175 PSIG, unless otherwise approved. Systems requiring pressures 175 PSIG and higher shall have pressure reducing valves, controls, and related equipment incorporated.
 4. Submit water flow information used for hydraulic calculations:
 - a. Fire hydrant flow tests shall be in accordance with NFPA 291 and the Authority Having Jurisdiction. Submitted for approval to the Authority Having Jurisdiction. Obtain and verify the water supply static pressure and residual pressure at full flow of the test hydrant, at a time of day, during the peak demand on the system, at the point of connection to the water utility system or at a nearby point acceptable to the approval authority. Obtain this data from flow tests or system network design calculations with reliability acceptable to the approval authority.

Use this data in flow calculations, and include it with the calculations submittal. Identify the testing agency, date of test, and the source of the test data.

- b. For the Municipality of Anchorage service area, contact AWWU and obtain hydraulic computer model information nearest hydrant flow for maximum day demand of year, or provide hydrant flow test and use 10% flow safety factor as minimum requirement, or as approved by the AHJ and the engineer.
 - c. If the Contractor conducts the flow test, a representative of the AHJ and Contracting Agency shall witness the test. Submit a written procedure and certification for the test, which shall be in compliance with NFPA 13 and NFPA 291 for flow testing water supplies and approved by the AHJ. Provide a minimum of 48 hours advance notice of test to the Contracting Agency.
 - d. Hydraulic calculations shall be accomplished in compliance with the procedures established in NFPA 13. In addition to minimum NFPA 13 standard, a minimum 10 percent pressure and flow buffers are required to be designed into the system. Where local authorities require additional buffer, comply with the more demanding requirement.
 - e. Hydraulic calculations accomplished by computer program for submittal shall be accompanied by a complete legend of the abbreviations, nodes, and symbols utilized on the computer printout.
 - f. Hydraulic calculations shall follow NFPA 13 and FMG requirements and shall clearly identify the following:
 - 1). Sprinkler type and "K" factor.
 - 2). Pipe and fittings type, size, and inside diameter.
 - 3). Fitting equivalent length chart that complies with the "C" factor and pipe type.
 - 4). NFPA or FMG hazard designation, design density, and size of the design remote area.
 - 5). The elevation of the "highest" sprinkler.
 - 6). Extended coverage sprinklers shall include design pressure and coverage identified on the drawings and manufacturer's product information to confirm usage. Hydraulic calculations shall identify extended coverage sprinklers and operating pressure.
 - 7). The available water supply and system demand at the point of connection to the water supply, indicated on a logarithmic graph and required safety factors. Include hose demands.
 - g. Equipment, pipe, fittings, and sprinklers used in calculations shall match installed system. Variances shall require redesign and installation by contractor.
- G. Quality Assurance/Control Submittals:
- 1. Design Data: Provide hydrant flow test reports or other information used for design.
 - 2. Certificates Initial Submittal:
 - a. Submit Contractor's qualifications, proof of three years' experience under this Contractor's firm name, and references for at least five projects in Alaska of similar type, size, or complexity.
 - b. Submit a copy of designer's NICET certification and resume', Alaska Permit number and level or Alaska P.E. license number.
 - c. Submit a copy of backflow assembly tester qualifications and certificate.
 - d. Submit a copy of Contractor's State of Alaska Fire Protection Permit and Administrator's License for the appropriate type of systems provided.
 - 3. Certificates Post Construction:
 - a. Provide test report for hydrostatic test of piping, to include a test of piping between the fire department connection and the check valve.
 - b. Provide test report confirming proper operation of tamper, supervisory, and flow, switches and system alarms.

- c. Submit test results to Factory Mutual Global for acceptance.
 - d. Provide a letter of certification stating that testing and flushing has been performed in accordance with the applicable codes and standards. Itemize codes and standards complied with.
 - 4. Provide Manufacturer's Installation Instructions, and Manufacturer's field reports.
 - 5. Fire suppression system shall be installed, tested, as-builts completed and installation approved by the Authority Having Jurisdiction, AHJ, before substantial completion request or notification is made.
 - 6. Structural tests and special inspections required by IBC or ASCE-07 shall be identified on the shop drawings, products submitted and coordinated during installation. Reports shall be submitted. Secure required services and pay for tests and inspections.
 - 7. Significant changes in piping due to on site coordination with other trades and existing conditions shall require hydraulic recalculation to confirm adequate pipe sizing and be resubmitted to AHJ and Contracting Agency's Insurance agency.
- H. Review, Approvals, and Permits Required:
 - 1. Obtain written review and/or approval of the entire fire suppression system design and arrangement from the following authorities:
 - a. Contracting Agency - (Approval).
 - b. Authority Having Jurisdiction, AHJ - (Approval).
 - c. Architect - (Review).
 - d. Mechanical Engineer - (Review).
 - e. Contracting Agency's Insurance Agency - Factory Mutual (FM Global) - (Review).
 - 2. Comply with the above review comments, revising the system design as required, and resubmitting in a timely manner, so as not to hinder the construction schedule.
 - 3. Obtain and pay for required permits, inspections, tests, and approvals as required by Authority Having Jurisdiction.
- I. Operation and Maintenance Manual Submittal:
 - 1. Include manufacturers' descriptive literature, operating instructions, installation instructions, testing certificates, maintenance and repair data, parts listings, and spare parts list.
 - 2. Electronic copy of the Authority Having Jurisdiction approved hydraulic calculations, drawings, and their review letter.
 - 3. Table showing NFPA 25 maintenance requirements.
 - 4. Provide an electronic copy of operations and maintenance manual in PDF format with bookmarks matching table of contents, including as-built shop drawings with each required paper copy.
- J. Closeout Submittals:
 - 1. Refer to Division 1 for general procedures for submittals.
 - 2. Project Record Documents: Record actual locations of components and locations of access doors required for access or valving.
 - 3. Warranty: Submit manufacturer warranty and ensure forms have been completed in Contracting Agency's name and registered with the manufacturer.
 - 4. Submit a written affidavit at the completion of the system, stating that the fire suppression system as installed complies with referenced Codes and Standards, Authority Having Jurisdiction requirements, and the Contracting Agency's Insurance recommendations.
 - 5. Provide written warranty as specified in Division 1.
 - 6. Issue a minimum one set of full size as-built drawings and maintenance data to the Contracting Agency's designated maintenance personnel, in addition to required submittals.
- K. Maintenance Information and Framed Building Plan:
 - 1. Coordinate with Section 28 31 00 - Addressable Fire Detection for fire alarm graphical

- displays and maps.
2. Orient the floor plan in a manner that is consistent with the building. Rotate graphic layout as required to show North, South, East, and West, as it applies to the building.
 3. Enclose the plan in a professionally fabricated metal picture frame with 1/8 inch rigid clear plastic cover. Minimum 1 inch frame width. Locate the framed plan on the wall with the spare sprinkler cabinet.
 4. Include step by step instructions to place the fire suppression system in service as well as to take it out of service. Provide complete maintenance information of primary fire suppression equipment, valves, fittings, sprinklers. Identify equipment indicating whether devices are replacement items or repairable. Provide parts list and suppliers for repairable items.
 5. Include step by step procedures for required operational weekly/monthly/annual service and testing as required by NFPA 25. Provide a complete report of field test operations and results prior to substantial completion.
- L. Record Drawings:
1. Maintain current and up-to-date As-Built prints of the fire suppression system at the job site.
 2. Approved full size As-Built drawings and electronic copy of as-built drawing files in PDF and DWG formats shall be submitted with IO&M manuals.

1.07 QUALITY ASSURANCE

- A. Furnish the services of a qualified and approved fire suppression subcontractor to provide the work of this specification section. Unless otherwise noted, this is substantially a "performance" specification.
- B. Minimum qualifications of the Contractor/subcontractor shall include the following:
1. Specialist Firm: Company specializing in automatic fire suppression/sprinkler systems, possessing a minimum of three years of experience with systems similar in nature to the type specified herein. Demonstrate satisfactory completion of five projects of similar size and scope in the State of Alaska; provide references.
 2. Design Certification: Drawings and calculations shall be prepared by a Level III or IV Fire Sprinkler Designer, certified by the National Institute for Certification in Engineering Technologies (NICET), in Fire Protection Engineering Technology Automatic Fire Sprinkler System Layout who also have their State of Alaska Permit IIC or IIC-DO license, or an Alaskan Licensed Professional Engineer.
 3. Maintain a complete stock of replacement parts.
 4. Remain on 24 hour call for emergency service.
 5. Maintain an office and telephone, with authorized representatives of the fire suppression contractor's firm, including the Designated Project Administrator, with a physical presence and address in Alaska.
 6. Bids by wholesalers, contractors, or any firm whose principal business is not that of manufacturing and/or installing fire suppression systems are not acceptable.
- C. Material:
1. Equipment and components: Bear the "UL" label or the "FM" approval marking.
 2. Equipment and components: Bear the "FM" approval marking or "UL" if FM is not available and approved by Contracting Agency.
 3. Grooved joint couplings, fittings, valves, and specialties shall be from the same manufacturer, including grooving tools.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to the site under provisions of Division 1.
- B. Deliver and store valves in manufacturer's packaging with labeling in place.

- C. Prior to installation, pipes shall be wrapped with protective wrapping.

1.09 PROJECT/SITE CONDITIONS

- A. Temporary or conditional occupancy permits, or partial occupancy require alarm and life safety systems to be fully operational. Expedite installation and complete life safety requirements for temporary and phased occupancy. Existing portions of the building will be occupied and fully functional.
- B. Work shall be scheduled to minimize disruption of automatic fire suppression service, coordinate with Contracting Agency for shut down and fire watch requirements when the existing system is inoperable.
- C. Check dimensions indicated on the Architectural and Structural Drawings, and verify dimensions at the site before fabricating any portion of the system. Discrepancies in piping and head locations shall be corrected expeditiously to provide proper coordination of trades.
- D. Coordinate work with that of other trades to make sure that adequate space is provided, including requirements for accessibility and serviceability. Locate sprinkler heads a minimum 6 inches distance from ceiling T-Bar, structural elements, devices, and other installed equipment. Adjust final location of piping and heads in field to accomplish these requirements for coordination.
- E. Identify structural penetrations for pipes, and submit details of those penetrations to the Structural Engineer for approval. Replace structural members that are damaged, cut, or penetrated without approval at no additional expense.
- F. Design automatic fire suppression piping in this facility with full consideration given to the building occupants, minimizing inherent health risks caused by self-inflicted injury from the fire suppression system and/or damage to the system. This includes but is not limited to exposed pipes, security of system controls and service points, and sprinklers.

1.10 FIRE WATCH

- A. Provide a fire watch when the fire alarm system is inoperable for more than 4 hours cumulative during a 24-hour period.

1.11 ANNUAL MAINTENANCE AGREEMENT PROPOSAL

- A. Provide upon request a cost proposal for performing annual maintenance recommended by NFPA 25.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide only products that are a standard product of a manufacturer regularly engaged in the manufacture of fire suppression equipment.
- B. Products and materials shall have a minimum working pressure of 175 PSIG and capable of withstanding a hydrostatic test pressure of 200 PSIG at 2 hours test pressure without damage, unless noted otherwise for higher pressure ratings or basis of design includes higher pressure ratings.
 - 1. Exception for approved ancillary devices that are normally isolated from the fire water and sprinkler lines shall have a minimum rated 150 PSIG working pressure.
- C. Submittals are required for all equipment, materials, and products.
- D. Glycol systems for fire suppression shall not be used.
- E. Exterior items shall be chrome finish or stainless steel.

2.02 LABELS, TAGS, AND APPROVALS FOR PRODUCTS

- A. Products UL or FM listed, labeled, and specifically approved for the fire suppression application where they are used.
- B. Products FM listed, labeled, and specifically approved for the fire suppression application where they are used.
- C. Label pipes, riser assemblies, and alarm valves, including zone designation; enamel on metal for valves.
- D. Tag equipment for maintenance and operations. Include in shop drawings and O&M manual.

2.03 MANUFACTURERS

- A. Sprinkler System and Components:
 - 1. AGF.
 - 2. Central.
 - 3. Croker.
 - 4. Gem Sprinkler.
 - 5. Grinnell.
 - 6. Kennedy.
 - 7. Metraflex.
 - 8. Milwaukee.
 - 9. Notifier Company.
 - 10. Potter-Roemer.
 - 11. Potter Electric.
 - 12. Reliable.
 - 13. System-Sensor.
 - 14. Tyco.
 - 15. Tolco.
 - 16. Victaulic.
 - 17. Viking.

2.04 PIPE

- A. Plastic pipe is not allowed.
- B. Pipe shall be marked with the name of the manufacturer, model designation or schedule, and ASTM designation.
- C. Schedule 40 pipe to be used for threaded and cut groove fittings.
- D. The use of pipe nipples less than 1-inch in diameter and less than schedule 40 wall thickness is not allowed.
- E. Wet Pipe Sprinkler Systems:
 - 1. Metallic pipes shall be listed for the intended service by UL or FM.
 - 2. Whenever metallic pipe other than steel schedule 40 is utilized, submit a statement that the pipe complies with NFPA 13 standards, the pipe strength is adequate for the application, and the pipe corrosion resistance ratio (CRR) shall be equal or greater than 1.0, equivalent to schedule 40 pipe for the installed system. Include this CRR data in product submittal.

2.05 FLEXIBLE SPRINKLER HOSE WITH THREADED END FITTINGS

- A. Flexible one-inch 304 stainless steel flexible sprinkler hose products shall be FM Global or UL tested and approved and submitted for the specific application. The drop system shall include required mounting brackets and appurtenances.
- B. Equivalent length of 1" schedule 40 steel pipe and pressure drop information shall be

included in product submittal and hydraulic calculations.

2.06 FITTINGS, ABOVE GROUND

- A. Grooved Fittings, Couplings, and Mechanical Tees:
 - 1. Grooved Fittings: ductile iron fittings with flow equal to standard pattern. Fabricated or segmented fittings are not acceptable. Couplings and mechanical tees shall be standard painted, unless indicated otherwise.
 - 2. Grooved joint couplings shall consist of two ductile iron housing segments with pressure responsive gaskets and zinc plated, hot dipped galvanized or stainless steel hardware as required for application.
 - a. Rigid type: Couplings shall provide joint rigidity, support and hanging in accordance with NFPA 13.
 - b. Flexible type: For use in locations where vibration attenuation and stress relief or flexible connectors are required.
- B. Threaded fittings shall be compatible with piping system and include cast iron Class 125 and 250, and malleable iron Class 150 and 300 steel.
- C. Pipe Flanges shall be compatible with piping system and include cast iron Class 125 and 250, and malleable iron Class 150 and 300 steel.
- D. Welded Pipe Fittings for Wet Pipe Sprinkler Only: Limited to Weld-o-lets, Thread-o-lets, Gruv-o-lets, Tees, and Welded Flanges. Welding limited to shop fabrication work with approved quality control process, welding procedures, and welders for specific application.
- E. Welded pipe joints and fittings shall not be used on galvanized pipe or on pipes with wall thickness less than schedule 30.
- F. Clamp-on, saddle type, or mechanical tee are not allowed for new work.
- G. Other means of joining pipe are not permitted.

2.07 VALVES AND ALARM ASSEMBLIES

- A. Valves: UL or FM listed and labeled and specifically approved for the fire suppression application where they are used. Minimum working pressure 175 psi non-shock cold water. Higher pressure rating as required.
 - 1. Control Valves: Fire suppression system control valves shall be supervised with switches compatible with the fire alarm system or other methods in compliance with NFPA 13.
 - a. Butterfly Valves: Rated working pressure 300 psi non-shock cold water with pressure responsive seat, 360-degree circumferential seating. Weatherproof handwheel actuator housing and two integrated supervisory switches. Grooved, threaded, or wafer type acceptable.
 - b. NRS Gate Valves: Rated working pressure 250 PSIG non-shock cold water.
 - 2. Swing Check Valves, Spring-Assisted: Rated working pressure 250 PSIG non-shock grooved end, flanged, or wafer type, listed for vertical or horizontal installation.
- B. Test and Drain Valves:
 - 1. Test orifices shall be clearly identified and selected for smallest sprinkler orifice on system riser.
 - 2. Drain valve position clearly identified and valve accessible.
 - 3. Sight glass for visual confirmation of water flow.
 - 4. Valve assembly shall be bronze body.
- C. Provide sprinkler alarm valve assemblies, appropriate to the system, complete with trimmings and accessories for proper alarm initiation and interface with fire alarm system. Alarm valve internal components shall be replaceable without removing the valve from the installed position. Include water flow detector, inlet and discharge pressure gauges, main drain, and inspectors test connection.

- D. Provide electrical alarm and control wiring in accordance with NFPA 72 and Division 26 requirements.
- E. Provide identification sign (enamel on metal) for valves per NFPA requirements.
- F. Valves in galvanized piping systems shall be bronze.

2.08 SPRINKLER HEADS

- A. Provide sprinklers as required by NFPA 13 standards and in compliance with FMG criteria and the IBC Chapter 9. Sprinkler heads using O-ring water seals are not allowed. Work on existing sprinkler systems shall match existing sprinklers unless all sprinkler systems in coverage area are replaced. New sprinklers shall be glass bulb type, with hex-shaped wrench boss integrally cast into the sprinkler body. Sprinkler finish and style as follows:
 - 1. In areas with surface mounted light fixtures attached to finished suspended ceilings, provide standard spray pendant sprinklers, and escutcheons to position the sprinkler deflector below the light fixture. Sprinklers and escutcheons to be chrome finish.
 - 2. In areas with recessed lighting flush to the suspended ceiling finish, provide recessed standard spray pendant sprinklers. Sprinklers and escutcheons to be chrome finish.
 - 3. Sprinklers above ceilings and exposed ceiling areas shall be bronze finish, standard spray, upright or pendant type.
 - 4. Sidewall sprinklers shall be bronze finish in service areas, and chrome throughout public areas.
 - 5. Dry pendant and dry sidewall sprinklers protecting entry vestibules and other public areas susceptible to temperatures below 40 degrees F. shall be chrome finish recessed.
 - 6. Dry pendant and dry sidewall sprinklers protecting unheated areas and piped from wet pipe systems shall have an "A Length" dimension of not less than 18 inches.
 - 7. Sprinklers with orifices less than K-4.2 shall be noted during submittal for specific application for approval and have an independent strainer with access for maintenance.
 - 8. Guards are required on exposed piping sprinklers where subject to mechanical damage throughout workshops, crate storage and similar rooms, and sprinklers less than nine feet zero inches above finish floor. Provide the same brand sprinkler guard or escutcheon with the same finish as the sprinkler on which it is to be installed. Red guards are acceptable for bronze sprinklers only. Chrome finish guards are required for chrome sprinkler heads. Physically wire guards closed.
 - 9. Sprinklers temperature rating shall be installed according to NFPA 13.
 - 10. Provide a minimum of 2 spare sprinkler heads of each type and temperature rating, minimum of 6 total, and a minimum of one sprinkler wrench for each type of installed sprinkler. Wrenches shall directly engage the wrench boss cast into the sprinkler. Provide plugs where dry type sprinklers are used. Spare sprinkler cabinet shall be red sheet steel manufactured by the sprinkler manufacturer. Mount cabinet on the wall within 60 inches of the main sprinkler control riser.
 - 11. Provide additional sprinklers, as requested by Authority Having Jurisdiction, at no additional cost to the Contracting Agency.

2.09 MAIN DRAIN

- A. Provide main drain exterior fitting with fire hose threads and wall plate with outlet adapter, cap and chain for exterior discharge. Chrome finish.

2.10 PIPE AND EQUIPMENT ANCHORS, BRACING, HANGERS, AND SUPPORTS

- A. Provide seismic anchoring, bracing, supports, and clearance for equipment, piping and sprinkler heads per NFPA 13, International Building Code, and ASCE 7. Most conservative criteria shall govern.

- B. Provide flexible couplings, bracing, and other components required and compatible with the piping materials and fittings.
- C. Hangers, bracing, and seismic details and locations shall be included on the shop drawings.
- D. Seismic support shall be in accordance with Factory Mutual Property Loss Prevention Data Sheet 2-8, Earthquake Protection for Water-Based Fire Protection Systems.

2.11 INSPECTORS TEST CONNECTIONS

- A. Provide inspectors test connections for complete system testing, as indicated, and as required by Authority Having Jurisdiction.
- B. Chrome plate pipe and fittings exposed outside building. Provide chrome plated set screw escutcheon.

2.12 ELECTRICAL WORK

- A. Provide electrical components, equipment, wire, conduit, connections, devices, and services as required by NFPA 72 and Division 26 requirements.

2.13 VALVE SUPERVISION, TAMPER, SWITCHES

- A. Coordinate with Division 28 requirements.
- B. Provided by Division 28. Refer to Section 28 31 00 - Addressable Fire Alarm.

2.14 WATER FLOW DETECTORS

- A. Provided by Divisions 26, 27 and 28. Refer to Section 28 31 00 - Addressable Fire Alarm

2.15 PRESSURE GAUGES

- A. Pressure gauges shall be 3-1/2" corrosion resistant moving parts, polycarbonate window with connection not smaller than 1/4" NPT, and maximum limit not less than twice the normal system working pressure at the point where installed.
- B. Provide 3-way globe shutoff valve with provisions for removal and draining on each pressure gauge.

PART 3 - EXECUTION

3.01 GENERAL

- A. The contract documents have performance, materials, and installation requirements which exceed code minimums.

3.02 COORDINATION

- A. The fire suppression contractor shall coordinate their work with the work of other trades to assure timely installation and efficient use of areas including, but not limited to, boiler rooms, fan rooms, and ceiling spaces.
- B. Promptly remove any work installed without proper coordination and reinstall in a manner to allow for a good practical arrangement of items which need to be installed by other trades involved.
- C. In case of coordination dispute, consult the Contracting Agency and its decision shall be binding.
- D. Costs associated with coordination, arranging or rearranging of the fire suppression system shall be borne by the affected contractor, without causing any additional expense or delay to the Contracting Agency.
- E. Installation, testing, O&M manuals, record drawings, and AHJ approvals shall be

completed, submitted, and approved by the Contracting Agency before beneficial occupancy.

3.03 PIPING INSTALLATION

- A. Install pipes, fittings, and appurtenances in accordance with codes and recommended practices. Pipe weld seams to be in 9 o'clock position. Follow manufacturers' installation instructions.
- B. Installed system to have a corrosion resistance ratio (CRR) equal or greater than 1.0.
- C. Pipes and equipment not directly serving exit enclosures or exit passageways shall not be routed through them. Only pipes and equipment directly serving exit enclosures or exit passageways shall be allowed in these spaces. There shall be no penetrations whether protected or not between adjacent exit enclosures or exit passageways.
- D. Sprinkler system pipe and fittings shall be installed to flush and drain system. Drains shall be accessible. Discharge test pipes, backflow system demand flow tests, and system main drain to safe location outside. Coordinate discharge point with Contracting Agency.
 - 1. Arrange pipes to drain to the main drain valve where practicable. Where connection to the main drain or other exterior drainage is impractical, as shown on shop drawings, install low point drain stations in accordance with NFPA 13.
 - 2. Identify the location of drain and test stations with signs on access panels, ceiling panels, or walls adjacent to the station, visible from the floor.
 - 3. Drains shall have hose bibb other approved means for maintenance drainage where drainage to exterior safe location is not allowed or impractical.
 - 4. Coordinate routing of drain lines to waste receptors. Direct connection shall not be made between sprinkler drain lines and sewers.
- E. Sprinkler system to be installed to flush and drain system. Drains shall be accessible:
 - 1. Drain lines adjacent to sprinkler risers shall be consider as part of the sprinkler system from combination test/auxiliary drain valve for each zone or sub-zone to exterior discharge or plumbing receptacle.
 - 2. Discharge test connections inside building to plumbing receptacles.
 - 3. Provide auxiliary drain where change in piping direction prevents drainage through main drain valve.
 - 4. Direct connection shall not be made to a sewer system.
- F. Pipes shall be arranged to drain to the main drain valve where practicable. Where connection to the main drain or other exterior drainage is impractical, as shown on shop drawings, install low point drain stations in accordance with NFPA 13. Route drain lines to nearest waste receptor where possible.
- G. Seismic protection for the piping system shall be in accordance with NFPA 13, FMG, and ASCE
 - 7. Include seismic restraint details with installation shop drawings and accommodation for displacements across seismic joints.
- H. Provide clearance around pipes extending through walls, floors, ceilings, platforms, and foundations, including drains, fire department connections, and other auxiliary pipes. Holes shall be sized 2" larger than the pipe for pipe 1" to 3-1/2" and 4" larger for pipe 4" and larger, unless flexible couplings are located within 1 foot of each side of item penetrated, and excluding frangible construction that is not required to have a fire resistance rating.
- I. Install pipes to conserve building space and route pipes around roof hatches, electrical panels, access panels, and maintenance accesses.
- J. Minimum 3 inches clearance from structure not used to support pipes.
- K. Provide service access around equipment per manufacturer's requirements, minimum of 18 inches.

- L. Provide flexible couplings per NFPA 13 and at the following locations:
 - 1. Penetrated fire and smoke rated assemblies.
 - 2. Within 24 inches of building's expansion joints.
 - 3. Within 12 inches above and within 24 inches below for the floor in multistory buildings.
- M. Sprinkler pipes shall be substantially supported from the building structure, which shall support the water loaded pipe plus a minimum 250 pounds temporary point load applied at the point of hanging. Pipe hangers shall include 250 pounds and weight of 5 time pipe filled with water.
- N. Pipes shall be concealed, except at ceilings exposed to structure, or as noted. Conceal pipes in areas with finished ceilings. Coordinate with the other trades to take timely advantage of available space above ceilings, in pipe and duct spaces, and elsewhere.
- O. Pipes shall not be concealed in walls.
- P. Piping to sprinklers below ceilings with minimum 1-inch outlets.
- Q. Pipes in exposed ceiling areas shall be limited to branches serving heads in the area. Pipe routing shall be coordinated to minimize visual impact and approved prior to installation.
- R. Provide penetrations where pipes pass through walls, floors, or ceilings. Penetrations shall be in accordance with UL Fire Resistance Directory for "Through Penetration Firestop Systems (XHEZ)".
- S. Pipes supported from manufactured structural members shall comply with truss manufacturer's installation recommendations for hanger attachments and loading of pipe hangers.
- T. Pipes passing pre-drilled structural elements to be shown on approved shop drawings.
- U. Fasten trapeze members to truss chords or structural members.
- V. Install "beam clamp" type fasteners with retainer straps and locking nuts. Retainer strap shall be tight to beam.
- W. Pipe hangers: "rod and ring" type hangers throughout for dry pipe system. Minimum 1/2" of adjustment on each side of the hanger ring nut, to allow for piping grade adjustment in the future.
- X. Pipe size reductions by one-piece reducing fittings; bushing shall not be used.
- Y. Provide test connection for each flow switch and supervisory switch on each shutoff valve.
- Z. Install pressure gauges at system entrance, forward flow test main drain, floor control valve main drains, and where indicated.
- AA. Welded pipe shall be shop fabricated by certified welders and procedures. Field welding is not allowed. Welding of galvanized pipe is not allowed.
- BB. Coat exposed threads with corrosion inhibitive paint per manufacturer's instructions; "cold galvanization" for galvanized pipe and fittings.

3.04 GROOVED AND ROLLED FITTINGS

- A. Follow the manufacturer's suggested methods to prepare gaskets, pipes, and fittings to prevent leakage, system breakdown, and designed pipe and fitting movement.
- B. Cut grooved pipe shall be limited to schedule 40 pipe. Rolled grooved pipe shall be schedule 10 pipe or thicker wall.
- C. Welding fittings shall not be used on galvanized pipe.
- D. Installers to have been trained by the coupling manufacturer in the use of grooving tools and installation of product. The manufacturer's representative shall periodically visit the job site to ensure best practices are being followed.

3.05 SPRINKLER HEAD INSTALLATION

- A. Sprinkler heads to be centered per approved shop drawings. Changes due to field conditions shall be pre-approved.
- B. Sprinkler heads to be centered in 2 directions on acoustical lay-in panels and symmetrically laid out in each separate room or space with GWB type ceiling regardless of finishes and Code minimum requirements.
- C. Sprinkler heads shall be connected to system via minimum 1-inch diameter flexible stainless steel sprinkler hose in suspended ceiling areas, areas subject to tenant renovations, where indicated, and where required for seismic criteria. Ceiling systems with listed flex hose connections shall be identified on shop drawings.
- D. Escutcheons and cover plates shall be metallic and listed for the assembly.
- E. Provide guards where sprinklers may be subject to mechanical damage and in accordance with contract documents.
- F. Do not install sprinklers that have been dropped, damaged, show a visible loss of fluid, or a cracked bulb.
- G. The sprinkler bulb protector shall be removable by hand, without tools or devices that may damage the bulb.
- H. Sprinkler head temperature ratings shall be selected based upon installed distance from heat source.
- I. Provide clearance for removal of sprinkler heads and minimum 1-inch clearance from structure. Exclude concealed, recessed, and flush types, which have clearances above the ceiling
- J. Identify sprinklers with less than 8 feet between them and include listing and NFPA 13 criteria.

3.06 DRY SPRINKLER HEADS

- A. Provide dry sprinkler heads in areas potentially subject to freezing including, but not limited to ceilings of entry vestibules, overhangs requiring fire suppression, rooms with combustion air openings, existing unheated areas, and other areas where temperatures may drop below 40 degrees F.
 - 1. Provide insulating boot for vapor tight and thermally insulated assembly. Coordinate with architectural requirements.
 - 2. Coordinate "A Length" dimension with each assembly penetrated when piped from wet pipe system. Include information in submittals.

3.07 SPRINKLER PIPES AT ELECTRICAL, TRANSFORMER, TELECOM/DATA, AND COMPUTER ROOMS

- A. Provide complete interface with electrical/transformer rooms in compliance with the National Electrical Code and AHJ.
- B. Route no pipes through rooms except branch piping supplying sprinklers protecting the room. Branch pipes shall not exit electrical room to supply additional sprinklers outside the room.
- C. No pipes shall be routed above electrical panels or telecommunication racks.
- D. Noncombustible hoods or shields, as described in NFPA 13, shall be provided to deflect direct sprinkler discharge away from electrical panels and equipment.
- E. Maintain a minimum of 42 inches clear in front of electrical panels, coordinate with electrical requirements.

3.08 PRESSURE GAUGES

- A. Pressure gauges shall be installed at fire water service entries, fire pump discharge pipe, pressure tanks, each main drain connection, top of each standpipe, and above and below

each: alarm check valve, dry pipe valve, deluge valve, backflow preventer, or system riser check valve.

- B. Gauges shall be installed to permit removal and gauge connections shall be equipped with a shut-off valve and provisions for draining.
- C. Gauges shall be located so that water cannot freeze.

3.09 IDENTIFICATION

- A. Valves: Control, auxiliary control, drain, and test connection valve shall have permanently secured weatherproof metal identification signs.
 - 1. Systems with more than one control valve that must be closed to work on an area shall have a sign referring to existence and location of other valves.
 - 2. Control valve identification to include its function and what it controls.
- B. Coordinate with valve, zones, and pipe identification with Framed Building Plan and fire alarm nomenclature.
- C. Rooms containing control valve and similar equipment requiring fire department identification or access shall have signage.
- D. Coordinate exterior and interior signage with architect and AHJ requirements.
- E. Sprinkler system hydraulic design and relevant general information. Information shall meet NFPA 13 and NFPA 25 requirements for inspection, testing, and maintenance.

3.10 ELECTRICAL WORK

- A. Provide electrical work, connections, routings, signals, power, and services as required by NFPA 72 and Division 26 requirements.
- B. Coordinate switches, connections, alarms, and number and type of devices with electrical work. Devices shall be compatible with Fire Alarm System requirements.

3.11 ACCESS DOORS

- A. Provide access doors where "Fire Suppression" valves, switches, drain valves, or other controlling or monitoring devices are concealed. Label doors for quick location and recognition of concealed devices. For rated assemblies provide rated access door to match assembly's rating. Paint door to match existing adjacent surfaces, coordinate with architectural requirements. Refer to Section 22 11 00 - Domestic Water Piping and Specialties, for door specification.

3.12 INSPECTORS TEST PIPING

- A. Discharge inspectors test pipes to approved floor drains in non-public areas, or outside building, but not on main walkways or over architectural surfaces easily stained or difficult to clean. Do not terminate discharge more than 48 inches above grade. Discharge main test and drain pipes used for service line flow testing outside and terminate with a 2-1/2" hose connection.

3.13 FLUSHING

- A. New systems shall be arranged for flushing. Cross main ends shall be provided with readily removable fittings and shall terminate with 1-1/4" or larger pipe.
- B. Flush pipes before pressure testing.

3.14 FIELD QUALITY CONTROL

- A. Arrange for proper witnessing of tests as required by Authority Having Jurisdiction and as specified elsewhere. Contracting Agency's representative may witness tests. Notify

- Contracting Agency a minimum of 3 days in advance of test.
- B. Arrange new and existing systems in or serving the area of work for testing. Conduct tests in accordance with applicable codes for new and existing systems in or serving area.
 - C. Conduct tests in accordance with applicable codes. Test above ground pipes at minimum 200 PSIG hydrostatic for two hours.
 - D. Test tamper, supervisory, flow, and system alarm actuations and alarm monitoring systems.
 - E. Submit test results to Factory Mutual Global for acceptance.
 - F. Pipe shall not be concealed until satisfactorily pressure tested.
 - G. Log of test shall be kept at the job site and shall identify:
 - 1. Who performed the test,
 - 2. Time and date of test,
 - 3. Section of system tested,
 - 4. Results of test,
 - 5. Completed Contractor's Material and Test Certification forms.
 - H. Verify permanently marked weatherproof metal "Hydraulic Design Information Sign" is secured with corrosion resistant fastener at each alarm valve and information matches approved shop drawings and hydraulic calculations.
 - I. Provide a letter of certification stating that testing and flushing has been performed in accordance with the applicable codes and standards. Itemize codes and standards complied with.

3.15 TRAINING AND DEMONSTRATION

- A. Provide annual operational test including flow performance in accordance with NFPA 13 and NFPA 25 with Contracting Agency's representative and Owner's maintenance personnel.
- B. Train the Owner's designated maintenance manager in the operation and maintenance of the entire fire suppression system, minimum of 4 hours on-site training.
- C. Training materials shall include approved O&M manual and as-built drawings.
- D. Provide documentation stating date and length of training with list of attendees, instructor, and sign-off by Contracting Agency's representative stating that training and demonstration has been completed.

END OF SECTION

DOMESTIC WATER PIPING AND SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Pipe, fittings, and connections for domestic potable water system.
 - 2. Mechanical coupling systems.
 - 3. Piping accessories.
 - 4. Valves.
 - 5. Water hammer arresters.
 - 6. Access doors.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 20 05 05 - Mechanical Demolition
 - 3. 20 05 29 - Mechanical Hangers and Supports
 - 4. 20 05 48 - Vibration and Seismic Control
 - 5. 20 05 53 - Mechanical Identification
 - 6. 20 07 00 - Mechanical Insulation
 - 7. 21 10 00 - Water Based Fire Suppression Systems
 - 8. 22 13 00 - Sanitary Waste and Vent Piping and Specialties
 - 9. 22 40 00 - Plumbing Fixtures

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Codes and Standards:
 - 1. See Section 20 00 00 - Mechanical General Requirements.
 - 2. Foundation for Cross-Connection Control and Hydraulic Research, 9th edition, University of Southern California.
 - 3. IAPMO Uniform Plumbing Code, UPC
 - 4. NSF/ANSI 61 - Drinking Water System Components - Health Effects.
- B. Abbreviations, Acronyms and Definitions:
 - 1. Refer to Division 1 for general abbreviations, acronyms, and definitions.

2. Refer to Section 20 00 00 - Mechanical General Requirements for general mechanical related definitions.
3. Refer to Mechanical Drawings legend sheet for general mechanical related abbreviations.

1.05 SYSTEM DESCRIPTION

- A. Design Requirements:
 1. This section describes specific requirements, products, and methods of execution for interrelated systems necessary for the various plumbing systems.
 2. Wetted surfaces of pipes, fittings, valves, and equipment in potable water systems shall be lead free as defined by NSF 61.
- B. Performance Requirements:
 1. Potable water systems shall perform quietly, with no objectionable vibration transmitted to the surrounding construction.
 2. Replace piping and equipment that does not perform as intended with properly operating equipment.

1.06 PRE-INSTALLATION MEETINGS

- A. See Section 20 00 00 - Mechanical General Requirements.

1.07 SUBMITTALS

- A. Refer to Section 20 00 00 - Mechanical General Requirements for general submittal requirements for the items listed below, supplemented with the additional requirements listed:
- B. Product Data:
 1. Submit product literature for items specified in Part 2 and those products required by the performance standards of this section. Literature clearly annotated to indicate specified salient features and performance criteria.
 2. Indicate valve data and ratings.
 3. Provide plumbing specialty component sizes, rough-in requirements, service sizes, and finishes.
- C. Shop Drawings:
 1. This Section shop drawings to be submitted under Section 20 00 00 - Mechanical General Requirements.
 2. Show placement of fixtures and plumbing equipment.
- D. Certificates: Provide certificate of compliance from Authority Having Jurisdiction indicating approval of installation of cross contamination protection devices.
- E. Manufacturer's Installation, Operation, and Maintenance (IO&M) Manuals.
- F. Test and Evaluation Reports:
 1. Submit hydrostatic pressure test report.
 2. Submit sterilization of system report.

1.08 CLOSEOUT SUBMITTALS:

- A. Refer to Section 20 00 00 - Mechanical General Requirements for general closeout submittal requirements for the items listed below, supplemented with the additional requirements listed:

1.09 QUALITY ASSURANCE

- A. See Section 20 00 00 - Mechanical General Requirements.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. See Section 20 00 00 - Mechanical General Requirements.

1.11 WARRANTY

- A. Manufacturer Warranty: See Section 20 00 00 - Mechanical General Requirements for general mechanical warranty requirements.

PART 2 - PRODUCTS

2.01 WATER SERVICE PIPING (ABOVE GRADE INSIDE BUILDING)

- A. Copper (Hard drawn):
 - 1. Tubing: Type L (ASTM B88).
 - 2. Fittings:
 - a. Cast copper alloy (ASME B16.18).
 - b. Wrought copper and bronze (ASME B16.22).
 - 3. Joints: Solder, Grade 95TA (ASTM B32).
- B. Copper Press Fitting System:
 - 1. Limited to tubing sizes 4 inch and smaller.
 - 2. Cast or wrought copper fittings, ASME B16.51. Pre-formed grooves with pre-lubricated EPDM O-rings designed to seal fitting to copper tubing water tight with the use of manufacturer's crimping tool. Fittings shall be rated for 250 degrees F and 200 PSI.
 - 3. IAPMO UPC listing.
 - 4. Manufacturer: Viega ProPress, NIBCO Press System, no substitutions.
- C. Grooved Copper Mechanical Coupling Piping system:
 - 1. May be used in hot and cold water piping systems.
 - 2. Tubing: ASTM B88, Type L hard drawn.
 - 3. Mechanical Coupling: Victaulic Style 607 rigid ductile iron couplings for copper.
 - 4. Gaskets: EHP gaskets suitable and approved for hot water up to 250 degrees F.
 - 5. Flange Adaptors: Victaulic Style 641, ductile iron, for connecting grooved copper tubing with ANSI Class 125 cast iron and Class 150 steel flanged components.
 - 6. Fittings: Victaulic, copper or bronze sand casting fittings.
 - 7. Manufacturer: Victaulic only, no substitutions.
- D. CPVC Plastic Piping System (cold water piping (all sizes) and hot water piping over 2 inches):
 - 1. Tubing and Fittings: Extruded/molded CPVC CTS (ASTM D1784, D2846). Corrosion-resistant, plenum rated. Rated for 180 degrees F and 100 PSI. Schedule 40 on piping up to 2 inches; schedule 80 on piping 2-1/2 inches and larger. Refer to Section 20 0529 Hangers and Supports for hanger spacing requirements.
 - 2. Fittings: CTS CPVC by brass threaded transition fittings.
 - 3. Joints: Socket type, joined with solvent cement (ASTM F493).
 - 4. Solvent Cement:
 - a. Listed by NSF International for use with potable water.
 - b. Manufacturer: Fry Technology, IPS Corporation, Schwartz Chemical of Canada Ltd., Oatey.
 - 5. Manufacturers of FlowGuard Gold pipe:
 - a. Bow Plastics.
 - b. Charlotte Pipe and Foundry Co.
 - c. Cresline Plastic Pipe Co., Inc.
 - d. Genova Products.
 - e. Harvel Plastics.
 - f. KBI Company.

- g. NIBCO.
- h. No substitutions.

2.02 UNIONS (STANDARD)

- A. Steel Piping (Threaded):
 - 1. Class 150 malleable iron, ground joint, copper or copper alloy seat. AnvilStar Figure 463. (150 PSIG steam, 300 WOG).
 - 2. Where indicated: Class 250 malleable iron ground joint, copper or copper alloy seat. AnvilStar Figure 554.
- B. Copper Piping (Sweat and Threaded): Cast bronze, ground joint, copper to copper, or copper to threaded joint. Nibco 733-LF series.

2.03 DIELECTRIC ISOLATORS (ELECTRICALLY INSULATING)

- A. Provide dielectric unions for 2 inch pipe and smaller.
- B. Provide dielectric flanges for 2-1/2 inch pipe and larger.
- C. Insulating gaskets, all types, shall be suitable for fluid type, temperature and pressure.
- D. Galvanized pipe to copper: Brass threaded end and sweat copper end.
- E. Black steel to copper: Zinc plated steel threaded end and sweat copper end.
- F. Manufacturers: Capitol, Epco, Control Plastics, Watts, or approved equal.

2.04 VALVES

- A. General:
 - 1. Select valves of the best quality and type suited for the specific service and piping system used. Minimum working pressure rating 125 PSIG saturated steam or 200 PSIG WOG. Packing material or seals shall not contain asbestos.
- B. Ball Valves:
 - 1. Two (2) inch and smaller: Two piece type, full port, bronze body and silicone bronze ball or chrome plated brass ball, TFE seats, blowout proof stem, 150 PSIG pressure/temperature rating (steam).
 - 2. Two and one half (2-1/2) inches through four (4) inch: Two piece type, full port, bronze body and silicone bronze ball or chrome plated brass ball, TFE seats, 150 PSIG pressure/temperature rating (steam). May be substituted for gate valves except where otherwise indicated.
- C. Globe Valves:
 - 1. Two (2) inch and smaller: Bronze body, renewable disc suitable for service.
 - 2. Two and one half (2-1/2) inch and larger: Iron body, bronze trim, flanged, bronze disc. Bronze valves optional for 2-1/2 inch and three-inch.
- D. Swing Check Valves:
 - 1. Two (2) inch and smaller: Bronze body, horizontal swing, Y-pattern, Buna-N-disc for water, oil and gas. TFE disc for steam.
 - 2. Two and one half (2-1/2) inch and larger: Iron body, horizontal swing, bolted bonnet, renewable bronze seat and disc, flanged.
 - a. Bronze valves optional for 2-1/2 inch and 3 inch.
- E. Drain Valves:
 - 1. Full port ball valve with threaded hose adapter with bronze end cap.
 - 2. Do not use sillcocks or butterfly valves as drain valves.

2.05 AUTOMATIC FLOW LIMITING VALVES

- A. Provide automatic flow limiting valves where shown on the Drawings.

- B. Provide valves with integral isolation valve, strainer, and pressure test ports.
- C. Provide valve with maximum flow set to design flow of the heat transfer device being served as scheduled.
- D. Manufacturer: Griswold Controls, or equal.

2.06 WATER HAMMER ARRESTERS

- A. Manufacturers:
 - 1. Sioux Chief.
 - 2. Precision Plumbing Products.
 - 3. Mifab.
 - 4. Zurn.
 - 5. Any other manufacturer meeting the requirements of the contract documents. Substitution request not required.
- B. Pressurized Piston Type:
 - 1. Description: ASSE 1010 certified water hammer arrester.
 - 2. Performance:
 - a. Maximum working temperature of 250 degrees F.
 - b. Maximum working pressure of 350 PSIG.
 - 3. Materials:
 - a. Seamless copper body.
 - b. EPDM o-rings lubricated with FDA approved compound.
- C. Expansion Bellows Type:
 - 1. Description:
 - 2. Performance:
 - a. Maximum working temperature of 250 degrees F.
 - b. Maximum working pressure of 350 PSIG.
 - 3. Materials:
 - a. Stainless steel body and bellows.

2.07 ACCESS DOORS

- A. Coordinate access door requirements for mechanical systems with Division 8.
- B. Provide UL labeled access doors and panels when required for fire resistance of surrounding construction.
- C. Provide key locks on access doors located in public areas below eight feet above finished floor.
- D. Prime coat steel.
- E. Coordinate location and size of access doors in walls, partitions, floors, and ceilings to correspond with valves, trap primers, cleanouts, and other devices requiring service or adjustment. Maintain any fire rating of the surrounding construction.
- F. Manufacturers: Elmdor, KARP, Milcor, MIFAB.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protection of In-Place Conditions: Cover equipment and plug piping connections to protect components from construction dirt and debris.
- B. Surface Preparation:
 - 1. Verify that excavations are to required grade, dry, and not over-excavated.
 - 2. Refer to Section 20 05 56 - Interior Trench Excavation and Backfill.

3.02 INSTALLATION

- A. Interface with Other Work:
 - 1. Review architectural drawings. Coordinate locations of access panels prior to piping installation.
 - 2. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.
 - 3. Rework required as a result of failure to follow the manufacturer's written installation instructions or to properly coordinate with related work shall be completed at no additional expense to the Owner.
 - 4. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Division 9 for instructions on painting and coordination.
- B. Water Service Piping:
 - 1. Install piping and plumbing products in accordance with UPC and manufacturer's instructions. Provide seismic anchoring, bracing, supports, and clearance for piping per UPC, IBC, and ASCE-07; most conservative criteria shall govern.
 - 2. Install piping to maintain headroom, conserve space, and not interfere with use of space.
 - 3. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
 - 4. At fixtures, install and connect hot water on left and cold water on right, as viewed when facing the fixture.
 - 5. Use of bullhead tee with opposed flow, double inlet configuration not allowed.
- C. Valves:
 - 1. Provide accessible ball type isolation valves at major piping branches, and on main lines as shown, and at terminal devices.
 - 2. Install automatic flow limiting valves for hot water recirculation system to be accessible and maintainable.
- D. Provide finished products with protective covers during balance of construction.
- E. Access Doors: Provide appropriate size and install such that plumbing features are readily accessible and maintainable.
- F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

3.03 REPAIR/RESTORATION

- A. Repair any product components broken during installation or startup with replacement parts supplied by the product manufacturer.
- B. Substitute replacement parts from other manufacturers are not acceptable.

3.04 SITE QUALITY CONTROL

- A. Site Tests:
 - 1. Test water piping hydrostatically at 100 PSIG or 150 percent of working pressure, whichever is greater, for a period of four hours. Observe piping during this period and repair leaks and retest.
 - 2. Air Test:
 - a. In general, air testing is not acceptable. In the event of low temperature conditions that would subject system piping to freezing, an equivalent air pressure test may be conducted in accordance with the Uniform Plumbing Code with prior Contracting Agency approval.
 - b. Test with clean air at 150 percent of system working pressure but not less than 75 PSIG or more than 150 PSIG. System shall hold pressure for not less than four hours. Inspect joints using leak detecting fluid or soapy water. Repair leaks

- and retest.
- c. Observe necessary safety procedures when testing with air including, but not limited to, use of protective goggles or face shields. Only persons directly involved in testing procedure shall be within 20 feet of a pipe under pressure.
3. Test results shall be certified in writing as required by General Conditions. Include dates and sections tested, test pressure, test duration, printed names and signatures of person performing the test and Contracting Agency witnessing the test.
- B. Inspection:
1. Arrange for inspections and provide notice to the Contracting Agency when the entire work or logical portions thereof, is ready for inspection.
 2. The Victaulic Company's factory trained representative shall provide on-site training for contractor's field personnel in the use of grooving tools and installation of grooved joint products. The representative shall periodically visit the jobsite and review contractor is following best recommended practices in grooved product installation. A distributor's representative is not considered qualified to conduct the training or jobsite visit(s).

3.05 SYSTEM STARTUP

- A. Start-up and operate plumbing systems in accordance with UPC requirements.

3.06 CLEANING

- A. Sterilization of Domestic Water Systems:
1. Sterilize each unit of completed supply line and distribution system with chlorine before acceptance for domestic operation.
 2. Sterilization as described below or by the system prescribed by the American Water Works Association Standard C-651. Apply the amount of chlorine to provide a dosage of not less than 50 PPM (parts per million). Provide chlorine manufactured in conformance to the following standards:
 - a. Liquid Chlorine: Federal Specification BB-C-120.
 - b. Hypochlorite: General Specification O-C-114a, type 11, Grade B or Federal Specification O-X-602.
 3. Introduce the chlorinating material to the water lines and distribution system after piping system has been thoroughly flushed. Maintain a contact period of not less than 24 hours. Flush the system with clean water until the residual chlorine content is not greater than 1.0 part per million.
 4. Open and close valves in the lines being sterilized several times during above chlorination.
 5. Certify in writing that sterilization has been completed in accordance with these requirements.
- B. After construction is completed, clean and wipe down exposed surfaces of piping and appurtenances.

END OF SECTION

SANITARY WASTE AND VENT PIPING AND SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Sanitary waste and vent pipe and fittings.
 - 2. Cleanouts.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 20 05 05 - Mechanical Demolition
 - 3. 20 05 29 - Mechanical Hangers and Supports
 - 4. 20 05 48 - Mechanical Vibration and Seismic Control
 - 5. 20 05 53 - Mechanical Identification
 - 6. 20 07 00 - Mechanical Insulation
 - 7. 22 11 00 - Domestic Water Piping and Specialties
 - 8. 22 40 00 - Plumbing Fixtures

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Codes and Standards: See Section 20 00 00 - Mechanical General Requirements.
- B. Abbreviations, Acronyms and Definitions:
 - 1. Refer to Division 1 for general abbreviations, acronyms, and definitions.
 - 2. Refer to Section 20 00 00 - Mechanical General Requirements for general mechanical related definitions.
 - 3. Refer to Mechanical Drawings legend sheet for general mechanical related abbreviations.
 - 4. ASA - American Supply Association.
 - 5. ASTM - American Society for Testing and Materials
 - 6. CISPI - Cast Iron Soil Pipe Institute.

1.05 SYSTEM DESCRIPTION

- A. Design Requirements: This section describes specific requirements, products and methods

of execution for sanitary waste systems and equipment.

B. Performance Requirements:

1. Sanitary waste systems shall perform quietly, with no objectionable vibration transmitted to the surrounding construction.
2. Replace piping that does not perform as intended with properly operating equipment.
3. Provide products with performance, output or salient features indicated or scheduled on the drawings.

1.06 PRE-INSTALLATION MEETINGS

- A. See Section 20 00 00 - Mechanical General Requirements.

1.07 SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements for general submittal requirements for the items listed below, supplemented with the additional requirements listed:

B. Product Data:

1. Submit product literature for items specified in Part 2 and those products required by the performance standards of this section. Clearly annotate literature to indicate specified salient features and performance criteria.
2. Provide plumbing specialty component sizes, rough-in requirements, service sizes, and finishes.

C. Shop Drawings:

1. This Section shop drawings to be submitted under Section 20 00 00 - Mechanical General Requirements.
2. Indicate pipe grade and direction of slope. Indicate elevation of piping at the beginning and end of each main, and at branch connections.
3. Coordinate exact locations of drains, floor penetrations and structural penetrations with applicable trades.

D. Test and Evaluation Reports:

1. Submit pressure test report.
2. Submit system flushing report.

1.08 CLOSEOUT SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements for general closeout submittal requirements for the items listed below, supplemented with the additional requirements listed:

B. Warranty Documentation.

C. Record Documentation:

1. Record actual dimensioned locations for buried or inaccessible piping.
2. Show actual cleanout locations and types.

1.09 QUALITY ASSURANCE

- A. See Section 20 00 00 - Mechanical General Requirements.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. See Section 20 00 00 - Mechanical General Requirements.

1.11 WARRANTY

- A. Manufacturer Warranty: See Section 20 00 00 - Mechanical General Requirements for general mechanical warranty requirements.

PART 2 - PRODUCTS

2.01 DRAINAGE PIPING, ABOVE GRADE

- A. Hub-and-Spigot Cast Iron Pipe and Fittings:
 - 1. Manufacturers:
 - a. Charlotte Pipe and Foundry.
 - b. Tyler Pipe and Coupling.
 - c. AB&I Foundry.
 - d. Equal.
 - 2. Pipe: ASTM A74, service weight.
 - 3. Fittings: Cast iron.
 - 4. Joints: ASTM C564, neoprene gasket system.
- B. Hub-less Cast Iron Pipe and Fittings:
 - 1. Manufacturers:
 - a. Charlotte Pipe and Foundry.
 - b. Tyler Pipe and Coupling.
 - c. AB&I Foundry.
 - d. Equal.
 - 2. Pipe: CISPI 301, ASA group 022.
 - 3. Fittings: Cast iron.
 - 4. Couplings:
 - a. Manufacturers:
 - 1). Husky Series 2000
 - 2). MG Coupling
 - 3). Any other manufacturer meeting the requirements of the contract documents.
Substitution request not required.
 - b. Description: No-hub cast iron pipe couplings conforming to standard CISPI 310.
 - c. Materials:
 - 1). Gaskets conforming to ASTM C564.
 - 2). Stainless steel clamp-and-shield assemblies.

2.02 ADAPTERS

- A. Manufacturers:
 - 1. Romac.
 - 2. Any other manufacturer meeting the requirements of the contract documents.
Substitution request not required.
- B. Use to connect pipes of same nominal size but different outside diameter or pipes of different material (cast iron to ductile iron, etc.).
- C. Rigid sleeve type coupling, ductile iron center ring and end rings, elastomeric gaskets, corrosion resistant bolts or polyethylene encasement.

2.03 CLEANOUTS

- A. Manufacturers:
 - 1. Zurn.
 - 2. Mifab.
 - 3. J.R. Smith.
 - 4. Any other manufacturer meeting the requirements of the contract documents.
Substitution request not required.
- B. Wall Cleanouts:

1. Cast iron body, recessed bronze plug.
2. Wall access panel or access cover with center screw.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Interface with Other Work:
 1. Review architectural and millwork shop drawings. Confirm location of cleanouts and access panels prior to installation.
 2. Coordinate and sequence installation of roof drains and piping with trades responsible for portions of this and other related sections of the Project Manual.
- B. Protection: Cover equipment and plug piping connections to protect components from construction dirt and debris.
- C. Surface Preparation:
 1. Verify that excavations are to required grade, dry, and not over-excavated.
 2. See Section 20 05 56 - Interior Trench Excavation and Backfill.

3.02 INSTALLATION

- A. Install plumbing systems in accordance with manufacturer's instructions and listing.
- B. Provide finished products with protective covers during balance of construction.
- C. Access Doors: Provide appropriate size and install such that plumbing features are readily accessible and maintainable.
- D. Piping:
 1. Grading: Minimum 1/4 inch per foot unless indicated otherwise on drawings and approved by AHJ for shallower slopes.
 2. Install piping to maintain headroom, conserve space, and not interfere with use of space.
 3. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
 4. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
 5. Where pipe support members are welded to structural building framing; scrape, brush clean, and apply one coat of zinc rich primer to welding.
 6. Connections:
 - a. Hub and hubless piping joints as specified above for underground piping.
 - b. Grooved and other joints: Assemble in accordance with manufacturer instructions.
- E. Vents:
 1. Install vents as indicated and as required by plumbing code. Add vents when field conditions increase the length of a trap arm or cause other changes in venting requirements.
 2. Unless otherwise indicated, the portion of the vent extending through roof shall be increased in size from one foot below roof assembly to termination as defined below. Increase as follows:
 - a. Vent size two-inch and under; vent thru roof three-inch.
 - b. Vent size three-inch; vent thru roof four-inch.
 - c. Vent size four-inch; vent thru roof six-inch.
 3. Termination of Vent: As required by the Uniform Plumbing Code.
- F. Cleanouts:
 1. Provide as indicated on drawings.
 2. If field conditions create additional offsets or increase length of piping shown, provide additional cleanouts as required by the Uniform Plumbing Code and AHJ.

3.03 REPAIR/RESTORATION

- A. Rework required as a result of failure to follow the manufacturer's written installation instructions or to properly coordinate with related Work shall be completed at no additional expense to the Owner.
- B. Repair any product components broken during installation or startup with replacement parts supplied by the product manufacturer.
- C. Substitute replacement parts from other manufacturers are not acceptable.

3.04 FIELD QUALITY CONTROL

- A. Inspections: Arrange for inspections and provide notice to the Contracting Agency when the entire Work, or logical portions thereof, is ready for inspection.
- B. Maintain current as-built drawings on-site recording including invert elevations, connections to fixtures, cleanouts, slopes, pipe sizes, and routing of pipes. Annotate sections of lines with dates when pressure tests have been approved by AHJ.
- C. Pressure Tests:
 - 1. Water Test: Test waste and vent system with water in accordance with the Uniform Plumbing Code.
 - 2. Air Test:
 - a. In general, air testing is not acceptable. In the event of low temperature conditions that would subject system piping to freezing, an equivalent air pressure test may be conducted in accordance with the Uniform Plumbing Code with prior Contracting Agency approval.
 - b. Observe necessary safety procedures when testing with air including, but not limited to, use of protective goggles or face shields. Only persons directly involved in testing procedure shall be with 20 feet of a pipe under pressure.
 - 3. Test results shall be certified in writing as required by General Conditions. Include dates and sections tested, test pressure, test duration, printed names and signatures of person performing the test and Contracting Agency witnessing the test.
- D. Verify penetrations are installed to maintain assembly integrity.

3.05 ADJUSTING

- A. Adjust functional components for proper operation in accordance with manufacturer's recommendations, or as otherwise directed.

3.06 CLEANING

- A. Clean and flush drain piping to remove dirt and foreign debris from systems.
- B. Clean exposed pipes, fittings, and materials.
- C. Provide written certification which documents that the complete sanitary sewer system has been flushed of foreign debris. Include date and printed names and signatures of person(s) performing the flush and Contracting Agency witnessing the flush.

3.07 CLOSEOUT ACTIVITIES

- A. Start-up and operate plumbing systems and equipment in accordance with the manufacturer's written installation and operation manual checklist.
- B. Document start-up and operational checks using the checklist and submit in accordance with submittal requirements.

END OF SECTION

STORM DRAINAGE PIPING AND SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Pipe, pipe fittings, and connections for storm water piping systems
 - 2. Cleanouts.
 - 3. Roof drains.
 - 4. Downspout nozzles.
 - 5. Electric heat trace.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 20 05 05 - Mechanical Demolition
 - 3. 20 05 29 - Mechanical Hangers and Supports
 - 4. 20 05 48 - Mechanical Vibration and Seismic Control
 - 5. 20 05 53 - Mechanical Identification
 - 6. 20 07 00 - Mechanical Insulation

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Codes and Standards:
 - 1. See Section 20 00 00 - Mechanical General Requirements.
 - 2. Underwriters Laboratories (UL).
- B. Abbreviations, Acronyms and Definitions:
 - 1. Refer to Division 1 for general abbreviations, acronyms, and definitions.
 - 2. Refer to Section 20 00 00 - Mechanical General Requirements for general mechanical related definitions.
 - 3. Refer to Mechanical Drawings legend sheet for general mechanical related abbreviations.
 - 4. ASA - American Supply Association.
 - 5. CISPI - Cast Iron Soil Pipe Institute.
 - 6. PSI - Pounds per Square Inch.
 - 7. PSIG - Pounds per Square Inch Gauge.

1.05 SYSTEM DESCRIPTION

1. Design Requirements: This section describes specific requirements, products, and methods of execution for storm drainage systems and equipment.
2. Rain leader and storm drain systems shall perform quietly, with no objectionable vibration transmitted to the surrounding construction.
3. Provide products with performance, output or salient features indicated or scheduled on the drawings.

1.06 PRE-INSTALLATION MEETINGS

- A. See Section 20 00 00 - Mechanical General Requirements.

1.07 SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements for general submittal requirements for the items listed below, supplemented with the additional requirements listed:
- B. Product Data:
 1. Submit product literature for items specified in Part 2 and those products required by the performance standards of this section. Clearly annotate literature to indicate specified salient features and performance criteria.
 2. Provide plumbing specialty component sizes, rough-in requirements, service sizes, and finishes.
- C. Shop Drawings:
 1. This Section shop drawings to be submitted under Section 20 00 00 - Mechanical General Requirements.
 2. Indicate pipe grade and direction of slope. Indicate elevation of piping at the beginning and end of each main, and at branch connections.
 3. Coordinate exact locations of roof drains, floor penetrations and structural penetrations with applicable trades.
- D. Manufacturer's Installation, Operation, and Maintenance (IO&M) Manuals.
- E. Test and Evaluation Reports:
 1. Submit pressure test report.
 2. Submit system flushing report.

1.08 CLOSEOUT SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements.
- B. Record Documentation:
 1. Record actual dimensioned locations for buried or inaccessible piping.
 2. Show actual cleanout locations and types.

1.09 QUALITY ASSURANCE

- A. See Section 20 00 00 - Mechanical General Requirements.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. See Section 20 00 00 - Mechanical General Requirements.

1.11 WARRANTY

- A. See Section 20 00 00 - Mechanical General Requirements.

PART 2 - PRODUCTS

2.01 STORM WATER PIPING, ABOVE GRADE

- A. Hub-less Cast Iron Pipe and Fittings:
 - 1. Manufacturers:
 - a. Charlotte Pipe and Foundry.
 - b. Tyler Pipe and Coupling.
 - c. AB&I Foundry.
 - d. Equal.
 - 2. Pipe: CISPI 301, ASA group 022.
 - 3. Fittings: Cast iron.
 - 4. Couplings:
 - a. Manufacturer:
 - 1). Husky.
 - 2). MG Coupling.
 - 3). Any other manufacturer meeting the requirements of the contract documents.
Substitution request not required.
 - b. Description: No-hub cast iron pipe couplings conforming to standard CISPI 310.
 - c. Materials:
 - 1). Gaskets conforming to ASTM C564.
 - 2). Stainless steel clamp-and-shield assemblies.

2.02 ADAPTERS

- A. Manufacturers:
 - 1. Romac.
 - 2. Dresser.
 - 3. Any other manufacturer meeting the requirements of the contract documents.
Substitution request not required.
- B. Description: Rigid sleeve type coupling used to connect pipes of same nominal size but different outside diameter or pipes of different material (cast iron to ductile iron, etc.).
- C. Materials: Ductile iron center ring and end rings, elastomeric gaskets, and corrosion resistant bolts or polyethylene encasement.

2.03 FLEXIBLE AND EXPANSION COUPLINGS

- A. Manufacturers:
 - 1. Fernco.
 - 2. Tech Specialties.
 - 3. Any other manufacturer meeting the requirements of the contract documents.
Substitution request not required.
- B. Materials: Flexible elastomeric or thermoplastic couplings with stainless steel clamp bands.

2.04 CLEANOUTS

- A. Manufacturers:
 - 1. Zurn.
 - 2. Mifab.
 - 3. J.R. Smith.
 - 4. Any other manufacturer meeting the requirements of the contract documents.
Substitution request not required.
- B. Wall Cleanouts:

1. Materials:
 - a. Cast iron body.
 - b. Recessed bronze plug.
2. Accessories: Wall access panel or access cover with center screw.

2.05 ROOF DRAINS

- A. Manufacturers:
 1. Zurn (Basis of Design).
 2. Mifab.
 3. J.R. Smith.
 4. Any other manufacturer meeting the requirements of the contract documents. Substitution request not required.
- B. RD-1 - Roof Drain:
 1. Description:
 - a. Nominal 15 inch diameter anchor flange with rain leader pipe outlet sizes as shown on drawings.
 - b. Basis of Design: Zurn model Z100.
 2. Materials: Coated cast iron drain body and combined flashing clamp and gravel stop.
 3. Accessories:
 - a. Galvanized steel sump receiver.
 4. Cast iron dome strainer.
- C. RD-2 - Overflow Roof Drain:
 1. Similar to RD-1 with two inch (2") external water dam.
 2. RD-1 and RD-2 - Roof Drain Set:
 3. Description:
 - a. Set contains primary (RD-1) and overflow (RD-2) roof drains with nominal 15 inch diameter anchor flange. Provide rain leader pipe outlet sizes as shown on drawings.
 - b. Basis of Design: Zurn model Z163.
 4. Materials:
 - a. Galvanized cast iron drain body.
 - b. Galvanized combined flashing clamp and gravel stop.
 - c. 24-inch by 48-inch galvanized sump receiver.
 5. Accessories:
 - a. Cast iron dome strainer.
 - b. Two inch (2") external water dam.

2.06 DOWNSPOUT NOZZLE

- A. Manufacturers:
 1. Zurn.
 2. Mifab.
 3. JR Smith.
 4. Any other manufacturer meeting the requirements of the contract documents. Substitution request not required.
- B. DS-1 - Downspout:
 1. Description:
 - a. Decorative outlet nozzle with no-hub connection for storm drainage overflow.
 - b. Basis of Design: Zurn model Z199.
 2. Materials: Nickel bonze body.
 3. Accessories: Stainless steel screen.

2.07 ELECTRIC HEAT TRACE

- A. Manufacturers:
 - 1. Raychem.
 - 2. Substitution request required.
- B. Description:
 - 1. UL Listed, CSA Certified, and FM Approved system for the de-icing of rain leader piping exterior to the building as shown.
 - 2. Basis of Design: Raychem model GM-2XT.
- C. Performance:
 - 1. Insertion Type:
 - a. Self-regulating.
 - b. 12 watts per foot nominal in ice or snow.
 - c. 277V supply voltage.
- D. Materials:
 - 1. Two 16 American wire gauge (AWG) nickel-coated copper bus wires embedded in a self-regulating polymer core.
 - 2. Fluoropolymer outer jacket.
- E. Accessories: Protect circuits feeding electric heat trace with ground fault circuit interrupters. Coordinate with Division 26.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protection of In-Place Conditions: Cover equipment and plug piping connections to protect components from construction dirt and debris.
- B. Surface Preparation:
 - 1. Verify that excavations are to required grade, dry, and not over-excavated.
 - 2. See 20 05 56 - Interior Trench Excavation and Backfill.

3.02 INSTALLATION

- A. Interface with Other Work:
 - 1. Review architectural and millwork shop drawings. Confirm location of cleanouts and access panels prior to installation.
 - 2. Rework required as a result of failure to follow the manufacturers written installation instructions or to properly coordinate with related Work shall be completed at no additional expense to the Owner.
 - 3. Coordinate storm sewer locations and invert at the building outline with Civil.
- B. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- C. Interior Storm Drainage Piping - Above Grade:
 - 1. Install piping and hub/hubless piping joints in accordance with manufacturer's instructions.
 - 2. Install piping to maintain headroom, conserve space, and not interfere with use of space.
 - 3. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
 - 4. Grade piping at 2% slope unless indicated otherwise on drawings.
- D. Roof Drains:
 - 1. Locate primary roof drains at low point of flat-profile roofs. Locate secondary roof drains adjacent to primary drains as indicated on drawings.

2. Install flexible expansion couplings per manufacturer's instructions.
- E. Cleanouts:
1. Provide as indicated on drawings.
 2. If field conditions create additional offsets or increase length of piping shown, provide additional cleanouts as required by plumbing code.
 3. Where practical or as indicated provide cleanouts on vertical rainwater piping immediately above grade. Locate cleanouts such that they are immediately accessible from behind a wall access door. Drain valve must be located such that a drain hose can be easily connected and removed through the access panel and the applicable riser can be completely drained by gravity to either an area floor drain or five gallon bucket.
- F. Where insertion type heating cable is used in rainwater and other piping with an open end, secure the end of cable a short distance within the open end of the pipe. Provide fittings as required to convey the cable out of the piping to connect to the electrical source. Make penetration watertight.

3.03 REPAIR/RESTORATION

- A. Repair any product components broken during installation or startup with replacement parts supplied by the product manufacturer.
- B. Substitute replacement parts from other manufacturers are not acceptable.

3.04 SITE QUALITY CONTROL

- A. Site Tests:
 1. Water Test: Test storm drainage system with water in accordance with the Uniform Plumbing Code.
 2. Test results shall be certified in writing as required by General Conditions. Include dates and sections tested, test pressure, test duration, printed names and signatures of person performing the test and Contracting Agency witnessing the test.
- B. Inspection: Arrange for inspections and provide notice to the Contracting Agency when the entire Work, or logical portions thereof, is ready for inspection.

3.05 CLEANING AND SYSTEM STARTUP

- A. Clean and flush storm drain piping and roof drains to remove dirt and foreign debris.
- B. Storm drain cleaning shall be certified in writing which documents that the complete storm drain system has been flushed of foreign debris. Include date and printed names and signatures of person(s) performing the flush and Contracting Agency witnessing the flush.

3.06 ADJUSTING

- A. Adjust functional components for proper operation in accordance with manufacturer's recommendations, or as otherwise directed.

END OF SECTION

PLUMBING FIXTURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Water closets.
 - 2. Urinals.
 - 3. Lavatories.
 - 4. Drinking fountains.
 - 5. Hose bibbs.
 - 6. ADA plumbing fixture piping insulation.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 20 05 05 - Mechanical Demolition
 - 3. 20 05 48 - Vibration and Seismic Control
 - 4. 20 05 53 - Mechanical Identification
 - 5. 20 07 00 - Mechanical Insulation
 - 6. 22 11 00 - Domestic Water Piping and Specialties
 - 7. 22 13 00 - Sanitary Waste and Vent Piping and Specialties

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Codes and Standards:
 - 1. See Section 20 00 00 - Mechanical General Requirements.
 - 2. American Society of Safety Engineers (ASSE).
- B. Abbreviations, Acronyms and Definitions:
 - 1. Refer to Division 1 for general abbreviations, acronyms, and definitions.
 - 2. See Section 20 00 00 - Mechanical General Requirements for general mechanical related definitions.
 - 3. Refer to Mechanical Drawings legend sheet for general mechanical related abbreviations.
 - 4. GPF - Gallons Per Flush.

5. PSI - Pounds per Square Inch.
6. PSIG - Pounds per Square Inch Gauge.
7. "Handicap", "handicapped", or "ADA compliant": Refers to fixtures that comply with the requirements of ANSI A117.1.

1.05 SYSTEM DESCRIPTION

- A. Design Requirements:
 1. This section describes specific requirements, products and methods of execution for plumbing fixtures.
 2. Plumbing fixtures in potable water systems shall be lead free as defined by the 2011 Reduction of Lead in Drinking Water Act.
- B. Performance Requirements:
 1. Potable water systems shall perform quietly, with no objectionable vibration transmitted to the surrounding construction.
 2. Replace piping and fixtures that do not perform as intended with properly operating piping and fixtures.

1.06 PRE-INSTALLATION MEETINGS

- A. See Section 20 00 00 - Mechanical General Requirements.

1.07 SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements for general submittal requirements for the items listed below, supplemented with the additional requirements listed.
- B. Product Data:
 1. Provide plumbing specialty component sizes, rough-in requirements, service sizes, and finishes.
 2. Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- C. Shop Drawings:
 1. This Section shop drawings to be submitted under Section 20 00 00 - Mechanical General Requirements.
 2. Indicate dimensions and weights of fixtures and equipment, and placement of openings and holes.
- D. Manufacturer's Installation, Operation, and Maintenance (IO&M) Manual.

1.08 CLOSEOUT SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements.

1.09 QUALITY ASSURANCE

- A. See Section 20 00 00 - Mechanical General Requirements.

1.10 DELIVERY, STORAGE AND HANDLING

- A. See Section 20 00 00 - Mechanical General Requirements.

1.11 WARRANTY

- A. Manufacturer Warranty: See Section 20 00 00 - Mechanical General Requirements, for general mechanical warranty requirements.

PART 2 - PRODUCTS

2.01 FIXTURES

- A. Traps, Stops and Supplies:
 - 1. Provide traps, stops and supplies for fixtures.
 - 2. Sink/lavatory P-Traps: 17 gauge chrome-plated tubular brass or cast brass.
 - 3. Supplies: Flexible, stainless steel.
 - 4. Stops: Quarter-turn, removable key type. Commercial quality metal components only; no plastic parts.
- B. Escutcheons: Provide chrome plated wall escutcheons for pipe penetrations into walls.
- C. Flush Valve Manufacturers: Sloan, no substitutions.
- D. Lavatory Faucet Manufacturers: Delta, Chicago Faucets, no substitutions.
- E. Carriers:
 - 1. Manufacturer: J.R. Smith, Josam, Zurn, MIFAB.
 - 2. Provide carriers for wall mounted fixtures.
- F. Fixtures specified elsewhere, or otherwise furnished:
 - 1. Provide appropriate strainer, tailpiece, trap, waste and supplies.
 - 2. Rough in and connect only.
- G. Handicapped Fixtures:
 - 1. Provide fixtures in compliance with the appropriate standard listed in Part 1.
 - 2. Provide fixtures operable with one hand without grasping, pinching or twisting of the wrist, and requiring not more than five pounds of operating force.
 - 3. Handicap accessible lavatories and sinks: Where piping is exposed, provide fixture insulation assembly. Refer to Section 20 07 00 - Mechanical Insulation.

2.02 WATER CLOSETS

- A. P-1 - Water Closet:
 - 1. Fixture: Wall hung, siphon jet, elongated bowl, low consumption (1.6 GPF), 1-1/2 inch top spud. American Standard model Afwall EL 1.6.
 - 2. Flush Valve: Sloan Royal model 111.
 - 3. Seat: Open front, commercial weight, heavy duty, solid plastic, stainless steel check hinge, without cover, white.
 - 4. Carrier: Floor mounted. No residential.
- B. P-1H - Water Closet:
 - 1. Fixture: Wall hung, siphon jet, elongated bowl, low consumption (1.6 GPF), 1-1/2 inch top spud. American Standard model Afwall EL 1.6.
 - 2. Flush Valve: Sloan Royal model 111.
 - 3. Seat: Open front, commercial weight, heavy duty, solid plastic, stainless steel check hinge, without cover, white.
 - 4. Carrier: Floor mounted. No residential.
 - 5. ADA: ADA compliant. Handicapped mounting height.

2.03 URINALS

- A. P-2 - Urinal:
 - 1. Fixture: Siphon jet, vitreous china, low consumption (1.0 GPF). Integral flush rim, wall hangers, 3/4 inch top spud. American Standard model Trimbrook 1.0.
 - 2. Flush valve: Sloan Royal model 186-1.0.
 - 3. Carrier: Floor mounted. No residential.
- B. P-2H - Urinal:
 - 1. Fixture: Siphon jet, vitreous china, low consumption (1.0 GPF). Integral flush rim, wall hangers, 3/4 inch top spud. American Standard model Trimbrook 1.0.

2. Flush valve: Sloan Royal model 186-1.0.
3. Carrier: Floor mounted. No residential.
4. ADA: ADA compliant. Handicapped mounting height.

2.04 LAVATORIES

- A. P-3H - Wall Lavatory:
1. Fixture: Wall mounted, vitreous china, 21-1/4 inch by 18-1/4 inch, front overflow, faucet holes on four inch centers. American Standard model Lucerne.
 2. Faucet: Push button, metered, deck mounted. Chicago Faucet model 1895-CP (or 3400- TCP for non-ADA).
 3. Mixing valve: Thermostatic, ASSE 1070 listed. Powers model LFLM495.
 4. Drain: Metal grid strainer. Chicago Faucet model 327-XCP.
 5. Floor mounted carrier. No residential.
 6. ADA: ADA compliant. Handicapped mounting height.

2.05 DRINKING FOUNTAINS

- A. DF-1H - Drinking Fountain/Bottle Filler:
1. Fixture: Wall mounted, dual height, polished stainless steel, hooded stream projector with push-button controls, perforated strainer, antimicrobial finish. Bottle filler with hands-free activation. Elkay model EZSTLDDWSVRSK or approved equal.
 2. Carrier: Wall mounted bracket. No residential.
 3. ADA: ADA compliant.

2.06 HOSE BIBBS

- A. HB-1 - Hose Bibb:
1. Wheel handle operated, with vacuum breaker.
 2. Flush mounted, with key operated hinged cover.
 3. Rough chrome finish.
 4. 3/4 inch threaded hose connection.
 5. Interior use only.
 6. Acorn model 8151.
- B. Manufacturers:
1. MIFAB.
 2. Woodford.
 3. Acorn.

2.07 ADA PLUMBING FIXTURE PIPING INSULATION ASSEMBLY

- A. Manufacturer: Skal+Gard, Model SG-100B, TCI Products, or approved equal.
- B. Description: Protective, molded, fire-resistant foam, single piece insulation manufactured specifically for plumbing fixture supplies and drains.
- C. Performance/Design Criteria: Insulation R factor 2.
- D. Materials:
1. Foam: 4.5 pounds per cubic foot.
 2. Skin: White fire retardant polyurethane.
 3. Twist fasteners.

PART 3 - EXECUTION

3.01 INSTALLERS

- A. Installer: Perform work by experienced personnel previously engaged in plumbing system

construction and fixture installation, and under the supervision of a qualified installation supervisor.

3.02 PREPARATION

- A. Confirm location and size of fixtures and openings before piping rough-in and installation.
- B. Verify that rough-ins have been provided, are correctly sized and are located within dimensional tolerances for fixtures to be installed prior to installation of fixtures.
- C. Interface with other Work: Review Architectural drawings and millwork shop drawings to verify correct fixture locations.

3.03 INSTALLATION

- A. Install piping and plumbing products in accordance with UPC and manufacturer's instructions. Provide seismic anchoring, bracing, supports, and clearance for equipment, piping, and sprinkler heads per UPC, IBC, and ASCE-07; most conservative criteria shall govern.
- B. Provide permanent metal and wire positioners, supports, and carriers to secure fixtures and piping rigidly in proper alignment without sway or sideplay.
- C. Anchor fixtures securely to withstand applied vertical load of not less than 250 pounds on the front of the fixture, without noticeable movement.
- D. Install fixtures plumb, level and to the finished architectural surface, so that the maximum gap between the fixture and the surface does not exceed 3/16 inch. Caulk the edge of the joint between fixture and surface with silicone or butyl type waterproof caulking compound.
- E. Install and connect hot water on left and cold water on right, as viewed when facing the fixture.
- F. Locate flush valve handles on handicapped accessible water closets on the wide side of the stall. Mount Accessible fixtures shown in the ADA guidelines to the heights indicated.
- G. ADA Plumbing Fixture Insulation Assembly:
 - 1. Insulate hot water supply and waste piping exposed beneath sink and lavatory fixtures designated on drawings or specified in this section, as intended for use by the handicapped.
 - 2. Install in accordance with ANSI A117.1.

3.04 REPAIR/RESTORATION

- A. Repair any product components broken during installation or startup with replacement parts supplied by the product manufacturer.
- B. Substitute replacement parts from other manufacturers are not acceptable.

3.05 SITE QUALITY CONTROL

- A. Non-Conforming Work: Rework required as a result of failure to follow the manufacturer's written installation instructions or to properly coordinate with related Work shall be completed at no additional expense to the Owner.

3.06 ADJUSTING

- A. Adjust functional components for proper operation in accordance with manufacturers' recommendations, or as otherwise directed.

3.07 CLEANING

- A. Clean fixtures and trim to a clean condition. Obtain a written certification from the Owner that this has been accomplished and accepted.

3.08 CLOSEOUT ACTIVITIES

- A. Demonstration: Provide 1 hour of demonstration conducted by authorized factory start-up personnel to the Contracting Agencies authorized maintenance personnel.
- B. Training: Provide 1 hour of operational instruction conducted by authorized factory start-up personnel to the Contracting Agencies authorized maintenance personnel.

END OF SECTION

TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: General requirements and methods of execution relating to the testing and balancing of the mechanical systems provided on this project.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 23 31 00 - Ducts and Accessories
 - 3. 23 37 00 - Air Outlets and Inlets

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Codes and Standards:
 - 1. See Section 20 00 00 - Mechanical General Requirements.
 - 2. National Environmental Balancing Bureau - Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems.
 - 3. National Environmental Balancing Bureau - Testing, Adjusting, Balancing Manual for Technicians.
 - 4. SMACNA - HVAC SYSTEMS Testing, Adjusting, and Balancing.
- B. Abbreviations and Acronyms:
 - 1. Refer to Division 01 for general abbreviations, acronyms, and definitions.
 - 2. Refer to Mechanical Drawings legend sheet for general mechanical related abbreviations.
 - 3. TAB: Testing, Adjusting, and Balancing.
 - 4. NEBB: National Environmental Balancing Bureau.
- C. Definitions:
 - 1. Refer to Section 20 00 00 - Mechanical General Requirements for general mechanical related definitions.
 - 2. Accuracy: Capability of an instrument to indicate the true value of a measured quantity.
 - 3. Adjusting: Varying of system flows by partially closing balancing devices, such as dampers, and valves, and varying fan speeds to achieve optimum system operating conditions within design and installation limitations.

4. Balancing: Methodical proportioning of air and hydronic flows through the system main, branches, and terminal devices using acceptable procedures to achieve the specified air or hydronic flow with testing and design limitations.
5. Calibrate: The act of comparing an instrument of unknown accuracy with a standard of known accuracy to detect, correlate, report, or eliminate by adjustment any variation in the accuracy of the tested instrument.
6. NEBB Certified TAB Firm: A Firm that has met and maintains all the requirements of the NEBB for Firm certification in TAB and is currently certified by NEBB. A NEBB Certified Firm shall employ at least one NEBB Qualified TAB Supervisor in the full-time management position.
7. NEBB Certified TAB Report: Data presented in a NEBB Certified TAB Report accurately represents system measurements obtained in accordance with the current edition of the *NEBB Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems*. Variances from design quantities that exceed NEBB or contract document tolerances are to be noted in the TAB report project summary.
8. NEBB Qualified TAB Supervisor: Full time employee of the TAB Firm in a management position who has successfully passed the supervisor level written and practical qualification examinations and maintains the Supervisor re-qualification requirements of NEBB.
9. NEBB Qualified Technician: Full time employee of the TAB Firm who has met the technician level experience requirements of NEBB and has successfully passed the technician level written and practical qualification examinations. A NEBB Qualified TAB Technician shall be supervised by a NEBB Qualified TAB Supervisor. Supervision does not infer constant oversight; a NEBB Qualified Technician is capable of performing assigned tasks with periodic supervision.
10. Precision: Ability of an instrument to produce repeatable readings of the same quantity, or a tightly grouped set of values, under the same conditions.
11. Range: Upper and lower limits on an instrument's ability to measure the value of a quantity for which the instrument is calibrated.
12. Resolution: Smallest change in a measured variable that an instrument can detect.
13. Testing: Use of specialized and calibrated instruments to measure temperatures, pressures, rotational speeds, electrical characteristics, velocities, and air and hydronic quantities for an evaluation of flow conditions.
14. Testing and Balancing: As used in these specifications, testing and balancing refers to testing, adjusting, and balancing (TAB) as described in the above references.
15. TAB: A systematic process or service applied to heating, ventilating, and air-conditioning (HVAC) systems and other environmental systems to achieve and document air and hydronic flow rates. The standards and procedures for providing these services are referred to as "Testing, Adjusting, and Balancing" and are described in this document.

1.05 SYSTEM DESCRIPTION

- A. Design Requirements: This section describes specific requirements, products and methods of execution for the testing, adjusting and balancing of the project.
- B. Performance Requirements: Furnish the services of a qualified and approved TAB Firm to perform the work of this specification section.
- C. The work of this section includes but is not necessarily limited to:
 1. Test and balance fans and supply and return ventilating systems.
 2. Test and balance fume hood exhaust system.
 3. Test and adjust fan filter differential pressure switches wherever provided.
 4. Work directly with the control subcontractor to obtain proper system adjustments.
 5. Provide a final report.
- D. The work of this section does not include:
 1. Adjusting burners for proper combustion operation.

2. Liquid waste transfer system adjustment.
3. Refrigeration work.
4. Control system adjustments, unless noted otherwise herein.

1.06 PRE-BALANCING MEETING

- A. Coordinate TAB work with other trades and requirements of other related sections of the Project Manual prior to commencing work.
- B. Schedule a pre-balancing meeting one week prior to commencing work of this Section. Refer to Section 20 00 00 - Mechanical General Requirements.

1.07 SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements for general submittal requirements for the items listed below, supplemented with the additional requirements listed.
- B. Product Data: Sample report forms and outlines indicating adjusting, balancing, and equipment data required prior to commencing work.
- C. Certificates:
 1. Submit the name and qualifications of TAB Firm for approval with general product submittals. Submit copy of TAB Firm's NEBB certification.
 2. Submit the names and certifications of the Firm's NEBB Qualified TAB Supervisor and NEBB Certified Technician.
- D. Balancing Report:
 1. Submit a complete report of the testing and balancing of all devices in a format equivalent to that shown in the SMACNA HVAC Systems Testing, Adjusting and Balancing manual. Compile the test data and submit eight copies of the complete test data for acceptance and/or analysis and recommendations.
 2. Provide report in soft cover, letter size, comb bound binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include drawings within report.
 3. Report Cover Sheet. Include the following data:
 - a. Project Name.
 - b. Project Address.
 - c. Names of Architect and Engineer.
 - d. Names of General Contractor and HVAC Contractor.
 - e. Report date.
 - f. Names of TAB technicians responsible for the measurements and report.
 4. System Review Sheet:
 - a. List air and hydronic systems balanced, with systems highlighted that were found to be performing outside design tolerances.
 - b. Include a summary of problems encountered, deviations from design, deficiencies in performance, remaining problems, recommendations, and comments.
 5. Instrument Calibration Report:
 - a. Include a complete list of test equipment used, including apparatus manufacturer's name, model number, serial number, and date last calibrated.
 - b. List the instruments used on the project during the balancing work, on an NEBB "Instrument Calibration Report" form, or equivalent form. This includes flow measuring hoods and other related devices.
 6. Air Systems Report: Prepare a report for each air system balanced. Tabulate data separately for each system. Describe balancing method used for each system. At minimum, include the following:
 - a. System Diagram: Include locations of air terminal units and pitot tube traverses. Include appropriate notes, static pressure reading locations, etc., taken during testing and balancing.

- b. Air Apparatus or Fan Test Report: Include pertinent data on the test report forms. If test data could not be measured, or is not applicable, indicate such on the report forms. List how each actual cfm measurement was obtained (duct traverse, total of outlet airflows, or a combination).
 - c. Duct Pitot Tube Traverse Reports: Include actual temperature and pressure readings recorded at the time of testing and balancing.
 - d. Air Outlet Test Reports: Include applicable A_k factors and terminal device sizes. If flow measuring hoods are used, indicate their use in the Remarks column.
 - e. Include complete identification of elements. Identify by box number, room name and number, air outlet symbol, orientation in room, etc., as necessary to identify the location of each element clearly and positively.
7. Hydronic Heating System Reports. Prepare a report for each hydronic system balanced. Tabulate data separately for each system. Describe balancing method used for each system. At minimum, include the following:
- a. Schematic Diagram: Include heat exchange equipment and locations of flow measuring devices.
 - b. Pump Test Report: Confirm test data was recorded and properly entered on form. Attach manufacturer's pump capacity curves, with the actual pump operating point plotted, to the test report form. List how the actual pump flow rate was determined (flow meter, pump curve, etc.).
 - c. Primary Heat Exchange Equipment: Confirm that appropriate test data has been recorded for the boilers, heat exchangers, chillers, and other primary heat exchange equipment. List how the actual flow rate(s) of each item was determined.
 - d. Terminal Heat Exchange Equipment: Confirm that heating coil and terminal unit temperatures and pressures were recorded and properly entered on form. List how each terminal unit flow rate was determined.
 - e. Include complete identification of elements. Identify by equipment tag number, room name and number, baseboard symbol, orientation in room, etc., as necessary to identify the location of each element clearly and positively.

1.08 QUALITY ASSURANCE

A. Qualifications:

- 1. The work described in this section shall be performed by a Firm certified by the National Environmental Balancing Bureau for air and hydronic balancing.
- 2. The Firm shall have a record of operation within Alaska for at least three years prior to bid date of this project and shall have demonstrated satisfactory completion of five projects of similar size and scope in the State of Alaska. Provide references if requested.
- 3. The Firm's Technician and Supervisor for this project shall be NEBB certified for their respective positions.
- 4. Bids by suppliers, contractors or any Firm whose principal business is not that of testing, adjusting, and balancing HVAC systems are not acceptable.

B. Balancing Standards:

- 1. Perform total system balance in accordance with NEBB Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.
- 2. Maintain one copy of balancing procedural document on site.
- 3. Use standard NEBB forms.

C. Timing of Work:

- 1. Sequence work to commence after completion of systems. Do not begin balancing and testing until the systems are complete and in full working order.
- 2. Schedule the testing and balancing work in cooperation with other trades.
- 3. Schedule completion of testing and balancing before Substantial Completion of Project.

D. Construction team responsibility to TAB Agency: Refer to 20 0000 - Mechanical General Conditions.

PART 2 - PRODUCTS – NO USED

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify systems are complete and operable before commencing work.
- B. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.
- C. Report defects and deficiencies that may preclude proper TAB of systems and equipment.

3.02 PREPARATION

- A. Schedule work under the provisions of Section 20 00 00 - Mechanical General Conditions.
- B. Provide calibrated instruments required for testing, adjusting, and balancing operations.
- C. Prior to starting work, review drawings and actual field conditions for additional balancing devices or components required for correct balance. Coordinate provision of additional balancing devices as required elsewhere in these specifications. Refer to Related Sections above.
- D. Preliminarily adjust grille, register, and diffuser blades or pattern controllers per drawings. If airflow blow patterns are not shown on drawings, adjust for uniform diffusion pattern(s) or diffusion into long dimension of room.

3.03 SPECIAL TECHNIQUES:

- A. Use instrumentation in accordance with NEBB requirements, calibrated to the accuracy standards specified by this organization.
- B. Flow measuring hoods are acceptable for measurement of ceiling diffuser performance if used in a manner as recommended by the manufacturer and calibration and accuracy data is provided with the balancing report.
- C. Upon request, make available to the Contracting Agency copies of current calibration certificates.

3.04 ACCEPTABLE CRITERIA

- A. Systems will be considered balanced in accordance with NEBB *Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems* when the following conditions are satisfied:
 - 1. Air Handling Systems:
 - a. Measured airflow quantities are within plus or minus 10 percent of design quantities. Deficiencies shall be noted in the TAB report.
 - b. There is at least one direct path with fully open dampers from the fan or terminal unit device to an air inlet or outlet. Additionally, if a system contains branch dampers, there will be at least one wide open path downstream of every adjusted branch damper.
 - 2. Air Outlets and Inlets:
 - a. Measured airflow quantities total to within plus or minus 10 percent of design to space and individual outlets and inlets in space to within plus or minus 10 percent of design.
 - b. Grilles, registers, and diffusers blades or pattern controllers are adjusted for uniform diffusion in the space. Re-adjust airflow patterns that result in airflow velocities greater than 50 FPM (feet per minute) at 5 feet above finish floor (AFF).

- B. If systems or components cannot be adjusted to within specified tolerances:
 - 1. Coordinate the replacement of sheaves, belts, or other components or devices needed for correct balance as required elsewhere in these specifications.
 - 2. Note deficiencies in the TAB report.

3.05 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on equipment sheaves, belts, dampers, valves, air outlets and inlets and each system according to the procedures contained in the current edition of the NEBB *Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems* and this section.
- B. Adjustments shall be made with air handler filters blanked off to create a filter pressure drop of 60 percent of the manufacturer's recommended filter final pressure. Where multiple filters are encountered each set shall be individually blanked off, for a cumulated pressure drop of 60 percent of each filters final pressure.
- C. Ensure recorded data represents actual measured or observed conditions.
- D. Permanently mark final settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- G. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Contracting Agency.
- H. Schedule and provide assistance in final adjustment and test of fire alarm system with Authority Having Jurisdiction.

3.06 SITE QUALITY CONTROL

- A. Make calibrated test instruments available to Contracting Agency to facilitate spot checks during testing and commissioning as appropriate.
- B. Re-balance components or systems found to be out of tolerance at no additional expense to the Owner.

END OF SECTION

HYDRONIC PIPING AND SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings for:
 - a. Hydronic heating piping.
 - b. Equipment drains and overflows.
 - 2. Piping accessories.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 20 05 05 - Mechanical Demolition
 - 3. 20 05 29 - Mechanical Hangers and Supports
 - 4. 20 05 48 - Vibration and Seismic Control
 - 5. 20 05 53 - Mechanical Identification
 - 6. 20 07 00 - Mechanical Insulation
 - 7. 23 05 93 - Testing, Adjusting and Balancing
 - 8. 23 82 00 - Terminal Heating and Cooling Units

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Codes and Standards:
 - 1. See Section 20 00 00 - Mechanical General Requirements.
 - 2. ANSI/ASHRAE/IESNA Standard 90.1-2001 Energy Standard for Buildings Except Low-Rise Residential Buildings.
 - 3. ASME Boilers and Pressure Vessel Code (1998), Sections IV & VI.
- B. Abbreviations, Acronyms and Definitions:
 - 1. Refer to Division 1 for general abbreviations, acronyms, and definitions.
 - 2. Refer to Section 20 00 00 - Mechanical General Requirements for general mechanical related definitions.
 - 3. Refer to Mechanical Drawings legend sheet for general mechanical related abbreviations.

1.05 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. This section describes specific requirements, products, and methods of execution for the system of liquid heat transfer throughout the project. The system of heat generation is specified elsewhere.
 - 2. Design expansion compensation system to adequately protect piping and structure from thermal expansion and contraction forces.
- B. Performance Requirements:
 - 1. Provide performance and output shown or scheduled on drawings.
 - 2. Provide loops, pipe offsets, and swing joints, or expansion joints where required or indicated.
 - 3. Pipes shall be capable of thermal expansion movement without disengagement of supports or forces on equipment connections.
 - 4. Provide structural work and equipment required to control expansion and contraction of piping. Verify that anchors, guides, and expansion joints provided, adequately protect system.
 - 5. Expansion Calculations:
 - a. Installation Temperature: 40 degrees F.
 - b. Hot Water Heating: 210 degrees F.
 - c. Domestic Hot Water: 140 degrees F.
 - d. Safety Factor: 30 percent.

1.06 PRE-INSTALLATION MEETINGS

- A. See Section 20 00 00 - Mechanical General Requirements.

1.07 SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements for general submittal requirements for the items listed below, supplemented with the additional requirements listed.
- B. Product Data:
 - 1. Submit product literature for items specified in Part 2 and those products required by the performance standards of this section. Literature clearly annotated to indicate specified salient features and performance criteria.
 - 2. Submit selection calculations for expansion joints and compensators.
 - 3. Design Data: Submit calculations for performance specified products and systems.
- C. Shop Drawings:
 - 1. Submit shop drawings for performance-specified products and systems.
 - 2. Submit shop drawings for piping systems to demonstrate proper layout and coordination.
 - 3. Provide shop drawings to show system layout with location and detail of flexible pipe connectors and expansion joints.
 - 4. Drawings of boiler room, fan rooms, and other areas with high-density piping, shall be shown at 1/4-inch scale or larger.
 - 5. Indicate elevation of piping above finish floor.
 - 6. Indicate dimensions and weights of equipment, and placement of openings and holes.
 - 7. Include reference to ductwork and other equipment where space coordination is necessary to avoid conflicts.
 - 8. Indicate mechanical and electrical service locations and requirements.
- D. Manufacturer Reports:
 - 1. Certificates, Manufacturer's Instructions, and Manufacturer's Field Reports:
 - a. Provide a complete manufacturer's written installation, operation and maintenance manual for each type of installed equipment. Annotate the manual to indicate applicable information for the specific equipment model(s) installed.

- b. Included with the manual one copy of the completed start-up and operation checklist. The checklist shall include:
 - 1). Printed names and signatures of the installers.
 - 2). Documentation from Manufacturer's representative and Contracting Agency that the equipment has been properly installed and is fully operational, thus validating the equipment warranty.
2. Test reports:
 - a. Provide certificate that cleaning of hydronic systems has been accomplished.
 - b. Provide certificate listing satisfactory results for the hydrostatic pressure tests.
 - c. Provide certificate listing satisfactory results for the operational tests.
3. Submit a letter to document that the training was conducted. Include in the letter the date, start/stop times for the training, list of attendees and signature/title of the person(s) providing the training.

1.08 CLOSEOUT SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements.
- B. Operation and Maintenance (IO&M) Manuals:
 1. Refer to Section 20 00 00 - Mechanical General Requirements, for IO&M Manual formatting requirements and number of copies required.
 2. Include the following:
 - a. Copies of approved submittal information.
 - b. Manufacturer's installation, operating and maintenance/repair instructions, parts listings, and spare parts list for each product. Annotate the manual to indicate applicable information for the specific equipment model(s) installed.
 - c. Computer software manuals and applicable licenses.
 - d. Completed start-up and operational test report as required to validate equipment warranty.
 - e. Start-up and operational test reports for each piece of equipment. Report shall include printed names and signatures of the installers and documentation that the equipment has been properly installed and is fully operational, thus validating the equipment warranty.
- C. Record Documentation: Record actual locations of equipment, valves, strainers, air vents, flexible pipe connectors, other components, and locations of access doors required for maintenance access in accordance with Section 20 00 00 - Mechanical General Requirements.

1.09 QUALITY ASSURANCE

- A. See Section 20 00 00 - Mechanical General Requirements.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. See Section 20 00 00 - Mechanical General Requirements.

1.11 WARRANTY

- A. Manufacturer Warranty: See Section 20 00 00 - Mechanical General Requirements, for general mechanical warranty requirements.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS

- A. Water Systems:
 1. Copper pipe three inches and smaller:

- a. Type L copper, wrought copper fittings.
- b. Fit joints using 430 silver solder, 95-5 tin-antimony or other approved lead-free solder. Solder type must be compatible with pipe and fittings. Solder containing lead shall not be allowed on the job site.
- c. Soldering flux: Water flushable, low corrosivity type meeting the requirements of ASTM B813. Flux shall have label indicating it meets these requirements.
- d. Extracted branch joints (T-Drill) may be approved when Contractor can demonstrate satisfactory experience with this method. Joints shall be brazed in accordance with the Copper Development Association Copper Tube Handbook using B-Cup series filler metal.

2.02 VALVES

- A. Select valves of the best quality and type suited for the specific service and piping system used. Minimum working pressure rating 125 PSIG saturated steam or 200 PSIG WOG. Packing material or seals shall not contain asbestos.
- B. Manufacturers: Crane, Nibco, Hammond, Jenkins, Grinnell, Milwaukee, Stockham.
- C. Ball Valves 2 inch and smaller: Two piece type, full port, bronze body and silicone bronze ball or chrome plated brass ball, TFE seats, blowout proof stem, 150 PSIG pressure/temperature rating (steam).
- D. Globe Valve two inch and smaller: Bronze body, renewable disc suitable for service.
- E. Swing Check Valves two inch and smaller: Bronze body, horizontal swing, Y-pattern, Buna-N-disc for water, oil and gas. TFE disc for steam.
- F. Drain Valves: Full port ball valve with threaded hose adapter with bronze end cap. Do not use sillcocks or butterfly valves as drain valves.
- G. Control valve:
 1. Control Valve: Factory fabricated, of type, body material, and pressure class based on maximum pressure and temperature rating of piping system, unless otherwise indicated.
 2. Globe Valve 2 inch and Smaller: Bronze body, bronze trim, rising stem, renewable composition disc, and sweat ends.
 3. Hydronic system globe valve shall have the following characteristics:
 - a. Rating: ANSI Class 125 for service at 125 PSIG and 32/250 Degs F operating conditions.
 - b. Internal Construction:
 - 1). Replaceable plugs and seats of stainless steel or brass.
 - 2). Single-Seated Valves: Cage trim provides seating and guiding surfaces for plug on top and bottom of guided plugs.
 - 3). Double-Seated Valves: Balanced plug; cage trim provides seating and guiding surfaces for plugs on top and bottom of guided plugs.
 - c. Sizing: 3 PSIG maximum pressure drop at design flow rate.
 - d. Flow Characteristics: Two-way valves shall have equal percentage characteristics; three-way valves shall have linear characteristics. Operators shall close valves against pump shutoff head.
 - e. Select heating valves shall fail to a Normally Open to heat position, unless otherwise indicated. Select cooling valves to normally closed to cooling position.
 - f. Three-way valves: Mixing type, unless otherwise indicated.

2.03 UNIONS (STANDARD)

- A. Copper Piping (Sweat): Cast bronze, ASTM B584 Alloy C84400, copper to copper. Nibco No. 733.

2.04 PRESSURE AND TEMPERATURE TEST PLUGS

- A. Provide where shown on drawings, specified in Part 3 or as required.
- B. Standard type for 1/8-inch diameter pressure or temperature probes. Self seal when probe removed and complete with threaded cap. Minimum continuous rating 125 PSIG and 220 Degs F coincident. Sealing element suitable for fluid in pipe.
- C. Provide one thermometer and one pressure gauge for each range required by system parameters.
- D. Manufacturers: Sisco, Peterson Equipment, or approved equal.

2.05 AIR VENTS

- A. Coin operated vent: Manual low profile vent for use in baseboard and other enclosures where automatic vent will not fit. 150 PSIG working pressure, 212 Degs F. operating temperature. Bell & Gossett No. 4V or approved equal.

2.06 STRAINERS

- A. Size two inch and under:
 - 1. Screwed brass or iron body for 175 PSIG working pressure.
 - 2. Y pattern with 1/32-inch stainless steel perforated screen.
- B. Manufacturers: Metraflex, Armstrong, Crane, Hayward, Watts Regulator, Hoffman, Sarco.

2.07 AUTOMATIC FLOW LIMITING AND ISOLATION VALVES

- A. Supply pipe side: Brass alloy body with stainless steel flow cartridge assembly, integral ball valve, 20 mesh strainer element, two pressure/temperature test valves and drain valve with hose bibb adapter and end cap. Body design allows removal of flow cartridge without disturbing piping connections. Threaded sweat adapter inlet. Union with sweat adapter outlet.
- B. Return pipe side: Forged brass body with integral ball valve, pressure/temperature test valve and manual air vent. Union with sweat adapter inlet. Threaded sweat adapter outlet.
- C. Calibration: Control flow within five percent of selected rating, over operating pressure range of at least 10 times minimum pressure required for control. Provide three operating pressure ranges with a minimum range requiring less than 3.5 PSID to actuate flow control cartridge.
- D. Flow Control Cartridge: Stainless steel, one piece cartridge with segmented port design and full travel linear coil spring.
- E. Provide supply and return components packaged as a system and labeled in accordance with the equipment schedule tag to match terminal heating unit served.
- F. Manufacturer: Griswold Controls, Bell & Gossett, or approved equal.

2.08 FLUSHING AGENT

- A. Synthetic organic dispersant manufacturer: CH2O, Product 6149 or approved equal.

2.09 WATER TREATMENT

- A. Hydronic loop treatment manufacturer: CH2O, Product 6439 or approved equal.

PART 3 - EXECUTION

3.01 INSTALLERS

- A. Installer: Perform work by experienced personnel previously engaged in hydronic system construction and under the supervision of a qualified installation supervisor.

3.02 PREPARATION

- A. Protection of In-Place Conditions: Cover equipment and plug piping connections to protect components from construction dirt and debris.
- B. Surface Preparation: Prior to installation of piping, verify that shop drawings are approved, and locations and routing have been coordinated with the work of other trades.

3.03 INSTALLATION

- A. Special Techniques:
 - 1. Install equipment in accordance with manufacturer's instructions and requirements of the codes specified herein.
 - 2. Provide finished products with protective covers during balance of construction.
 - 3. Provide accessible ball type isolation valves at major piping branches and at terminal devices. Provide drains and manual vents at main line and branch line valves to facilitate draining and filling piping sections. Provide caps on drain outlets.
 - 4. Access Doors: Provide appropriate size and install such that hydronic system features are readily accessible and maintainable.
 - 5. Install balancing valves and automatic flow limiting valves to be accessible and adjustable.
 - 6. Install piping to maintain headroom, conserve space, and not interfere with use of space.
 - 7. Use of bullhead tee with opposed flow, double inlet configuration not allowed.
 - 8. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
 - 9. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
 - 10. Thermal Expansion:
 - a. Install piping to allow for normal thermal expansion and contraction without stressing pipe, joints, or connected equipment.
 - b. Provide anchors where necessary and as shown.
 - c. Piping shall be guided and restrained as recommended by the manufacturer.
 - 11. Provide test plugs on both inlet and outlet sides of heat transfer elements to allow measurement of both fluid pressure drop and differential temperature.
 - 12. Provide pipe anchors, offsets, and loops as required to control the expansion of pipelines.
 - 13. Flushing:
 - a. Where hydronic piping installed under this project is connected to an existing hydronic system, provide branch isolation valves and provision for cleaning and flushing consisting of tees with valve, hose fittings and caps immediately adjacent to the branch isolation valves.
 - b. Clean internal surfaces of the completed heating system as follows:
 - 1). Flush hydronic piping to remove black magnetic iron oxide and mill scale from the system.
 - 2). Flush system piping with synthetic organic dispersant to remove grease. Circulate solution through system at 150 degrees F or greater for 12 to 24 hours.
 - 3). Repeat process until the system is clean to the satisfaction of the Contracting Agency.
 - 4). Flush system with fresh water as necessary to remove residual cleaning agent.
 - 5). Exercise proper care during flushing and cleaning of systems to make sure no damage is done to equipment, valves, fittings, or Work of other trades. Restore damaged system components or Work of other trades to new or original condition at no additional cost to Owner.

- B. Interface with Other Work: Coordinate and sequence installation of hydronic products with trades responsible for portions of this and other related sections of the Project Manual.

3.04 REPAIR/RESTORATION

- A. Repair any product components broken during installation or startup with replacement parts supplied by the product manufacturer.
- B. Substitute replacement parts from other manufacturers are not acceptable.
- C. Touch-up finished surfaces with touch-up paint provided by the equipment manufacturer.

3.05 SITE QUALITY CONTROL

- A. Non-Conforming Work: Rework required as a result of failure to follow the manufacturer's written installation instructions or to properly coordinate with related Work shall be completed at no additional expense to the Owner.
- B. Manufacturer Services:
 - 1. Verify units are installed and operational in accordance with the manufacturer's written installation instructions.
 - 2. Both the Contractor and Manufacturer's Representative(s) shall sign start-up and operational checklist to confirm proper unit installation and operation.
 - 3. Provide samples of the inhibited propylene glycol solution to the manufacturer for testing using the fluid analysis test kit provided.
 - 4. The manufacturer of the inhibited propylene glycol solution shall provide free testing of the solution 24 hours after system startup and again 90 days later to verify proper fluid performance for both tests.
 - 5. Provide one copy of manufacturer's test reports to the Owner. Adjust fluid concentration and/or correct deficiencies as addressed in the report.
- C. Hydronic System Cleaning and Treatment Coordination Meeting:
 - 1. Conduct a meeting prior to flush cleaning and treatment of the hydronic heating system to discuss cleaning agents, treatment chemicals and procedures to be used. Discuss system fill procedures with inhibited propylene glycol solution.
 - 2. Participants shall include the Contractor and Subcontractor directly performing the work and the Owner's Maintenance Staff personnel.
 - 3. Provide one week notice prior to the meeting.
 - 4. Cleaning, filling, and treatment of any hydronic system is not permitted until this coordination meeting has been conducted and the Contracting Agency's concerns have been adequately addressed.
- D. System fill:
 - 1. After flush cleaning the hydronic heating system, fill the primary system with water and add treatment chemicals to the concentration recommended by the manufacturer.
 - 2. Thoroughly vent the systems to include piping high points and equipment vents (pump casings, air separators, etc.).
- E. Site Tests:
 - 1. Hydrostatic Pressure Test:
 - a. Make sure hydronic heating system is filled with clean operating fluid. Hydrostatically test system to 100 PSIG. System must hold test pressure for a two hour period with no pressure drop to pass test.
 - b. Inspect system during test and repair leaks.
 - c. Provide written report indicating that the pressure test has been satisfactorily completed.
 - 2. Operational Test:
 - a. Inspect system for proper fluid circulation, sufficient clearance for expansion and contraction of piping and proper system pressure control.

- b. Note and correct discrepancies and deficiencies.
- c. Provide written report indicating that the operational test has been satisfactorily completed.
- 3. Test results shall be certified in writing as required by General Conditions. Include dates and sections tested, test pressure, test duration, printed names and signatures of person performing the test and Contracting Agency witnessing the test.
- F. Inspection:
 - 1. Arrange for inspections and provide written notice to the Contracting Agency when the entire work or logical portions thereof, is ready for inspection.
- G. Verify penetrations are installed to maintain assembly integrity.

3.06 SYSTEM STARTUP

- A. Start-up and operate hydronic heating systems and equipment in accordance with the manufacturer's written installation and operation manual checklist.
- A. Document start-up and operational checks using the checklist and submit in accordance with submittal requirements.

3.07 ADJUSTING

- A. Adjust functional components for proper operation in accordance with manufacturer's recommendations, or as otherwise directed.
- B. Coordinate and work directly with the Balancing and Testing Agency and the requirements of Section 23 05 93 - Testing, Adjusting and Balancing, to provide systems in proper operating order.
- C. Make corrections and adjustments as required by the Testing, Adjusting and Balancing (TAB) Agency in a timely manner.

3.08 CLEANING

- A. Waste Management: After construction is completed, clean and wipe down exposed surfaces of piping and appurtenances.

3.09 CLOSEOUT ACTIVITIES

- A. Demonstration: Provide 1 hour of demonstration conducted by authorized factory start-up personnel to the Contracting Agencies authorized maintenance personnel.

END OF SECTION

DUCTS AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Metal Ductwork and Fittings.
 - 2. Flexible Ductwork.
 - 3. Volume Dampers.
 - 4. Acoustic Linings
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 20 05 29 - Mechanical Hangers and Supports
 - 3. 20 05 48 - Mechanical Vibration and Seismic Control
 - 4. 20 07 00 - Mechanical Insulation
 - 5. 23 05 93 - Testing, Adjusting and Balancing
 - 6. 23 37 00 - Air Outlets and Inlets

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Codes and Standards:
 - 1. See Section 20 00 00 - Mechanical General Requirements.
 - 2. ASHRAE Standard 90.1-2010 Energy Standard for Buildings Except Low-Rise Residential Buildings.
 - 3. SMACNA HVAC Duct Construction Standards - Metal and Flexible, Third Edition 2005.
 - 4. SMACNA HVAC Air Duct Leakage Test Manual, Second Edition 2012.
 - 5. SMACNA Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems, Fifth Edition 2002.
 - 6. ACR the National Air Duct Cleaners Association (NADCA) Standard for Assessment, Cleaning and Restoration of HVAC Systems, 2013.

1.05 PRE-INSTALLATION MEETINGS

- A. See Section 20 00 00 - Mechanical General Requirements.

1.06 SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements for general submittal requirements for the items listed below, supplemented with the additional requirements listed.
- B. Product Data: Include manufacturer's detailed fire, smoke, and combination fire/smoke damper installation instructions for each specific wall, ceiling, and floor construction type(s) for the project.
- C. Installation, Operation and Maintenance (IO&M) Manuals.

1.07 CLOSEOUT SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements.
- B. Record Documentation: Record actual locations of ductwork and areas required for maintenance access in accordance with Section 20 0000 - Mechanical General Requirements.

1.08 QUALITY ASSURANCE

- A. See Section 20 00 00 - Mechanical General Requirements.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. See Section 20 00 00 - Mechanical General Requirements.

1.10 WARRANTY

- A. Manufacturer Warranty: See Section 20 00 00 - Mechanical General Requirements, for general mechanical warranty requirements.

PART 2 - PRODUCTS

2.01 METAL DUCTWORK AND FITTINGS

- A. General: Provide metal ductwork and fittings fabricated in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, G90 zinc coated unless otherwise noted.
- B. Low Pressure/Velocity Ductwork:
 - 1. Duct Pressure Class: 2 inches WC.
 - 2. Seal Class: A.
 - 3. Maximum Velocity: 1,500 FPM.

2.02 FLEXIBLE DUCTWORK

- A. Manufacturers:
 - 1. Thermaflex, Model M-KE.
 - 2. Hart & Cooley.
 - 3. JPL.
 - 4. Any other manufacturer meeting the requirements of the Contract Documents. Substitution request not required.
- B. Description: UL listed, Class 1 flexible ductwork in compliance with NFPA 90A and 90B.
- C. Performance/Design Criteria:
 - 1. Positive Pressure Rating:

Ten inches WC	(4"-12" ID).
Six inches WC	(14"-16" ID).

Four inches WC	(18"-20" ID).
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2. Negative Pressure Rating:

One inch WC	(4"-12" ID).
One half inch WC	(14"-20" ID).

3. Maximum Velocity: 5000 FPM.
4. Operating Temperature Range:
 - a. 0 degrees F to 140 degrees F (continuous).
 - b. Minus 20 degrees F to 250 degrees F (intermittent).
5. Insulating Value: R-4.2.

D. Materials:

1. Acoustically rated black polyester core permanently bonded to coated spring steel wire helix.
2. Fiberglass insulation.
3. Tear resistant, reinforced metalized vapor barrier.

2.03 VOLUME / BALANCING DAMPERS

A. Manufacturers:

1. Ruskin.
2. Greenheck.
3. Any other manufacturer meeting the requirements of the Contract Documents. Substitution request not required.

B. Materials:

1. Refer to SMACNA HVAC Duct Construction Standards - Metal and Flexible for fabricated volume damper construction requirements.
2. Round ducts to 12 inches diameter and rectangular to 18 inches width:
 - a. Flat sheet, galvanized steel, single blade damper.
 - b. Damper blade two gauges thicker than the duct gauge at the location installed (24 gauge minimum for round, 22 gauge minimum for rectangular).
 - c. Manual hand quadrant.
3. Round ducts over 12 inches diameter:
 - a. Flat sheet, galvanized steel, single blade damper.
 - b. Damper blade two gauges thicker than the duct gauge at the location installed (22 gauge minimum).
 - c. Manual hand quadrant with continuous steel rod.
4. Rectangular ducts over 18 inches width:
 - a. Flat sheet, galvanized steel, single blade damper.
 - b. Damper blade 18 gauge minimum.
 - c. Manual hand quadrant with continuous steel rod.
5. Accessible and lockable damper operators.

C. Extractors: Not Permitted.

D. Splitter Dampers: Not Permitted.

2.04 REMOTE VOLUME DAMPER OPERATORS

A. Manufacturers:

1. Duro-dyne.
2. Young Regulator.
3. Any other manufacturer meeting the requirements of the Contract Documents.

Substitution request not required.

- B. Provide flush mounted chrome plated remote operators with tamperproof cover, extension rod, and not more than one 90 degree angle gear drive.
- C. Regulator: Duro-dyne Series SRC-380 or Young Regulator 301.
- D. Angle Drive: Duro-dyne Model AD-38 or Young Regulator 927.

2.05 ACOUSTICAL LININGS

A. Manufacturers:

- 1. Knauf.
- 2. Johns Manville.
- 3. Owens-Corning.
- 4. Any other manufacturer meeting the requirements of the Contract Documents.
Substitution request not required.

B. Description:

- 1. UL listed.
- 2. NFPA 90A and 90B compliant.
- 3. One inch thick, 1.5 PCF, flexible, edge-coated, mat-faced glass fiber insulation bonded with thermosetting resin.
- 4. Does not promote growth of fungi or bacteria.

C. Performance/Design Criteria:

- 1. Maximum Velocity: 6000 FPM.
- 2. Operating Temperature Range: Up to 250 degrees F.
- 3. Maximum Water Vapor Sorption: Three percent by weight.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify location, size and type (i.e., fire resistive construction) of wall, floor and ceiling/roof penetrations.

3.02 PREPARATION

- A. Protection on In-Place Conditions: During construction, install temporary closures of sheet metal, cardboard or polyethylene taped over ductwork openings to prevent construction dust and debris from entering duct systems.

3.03 INSTALLATION

A. Metal Ductwork and Fittings:

- 1. Install, seal and support ductwork and fittings in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible for the duct pressure class and seal class specified. The use of "duct tape" as a duct seal method is prohibited.
- 2. Provide low pressure/velocity ductwork at the following locations:
 - a. VAV terminal unit discharge connections to air outlet connections.
 - b. Exhaust and relief air ductwork.
 - c. Constant volume ventilating systems.
- 3. Proprietary or other joint systems may be substituted for SMACNA details when submitted and approved in writing before starting work.
- 4. Duct penetrations: See Section 20 05 29 - Mechanical Hangers and Supports.
- 5. Provide standard 45-degree lateral wye takeoffs. When space does not allow 45-degree lateral wye takeoffs, use 90-degree conical tee or low-loss tee connections.
- 6. Do not use turning vanes in medium velocity duct systems.

7. Where steel ductwork is visible through air outlets or inlets, paint visible interior ductwork flat black.
- B. Flexible Ductwork:
1. Install, connect and support flexible ductwork in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
 2. Connection to air outlets in suspended grid ceiling systems: Provide a flexible duct length of 6 to 8 feet with one 90-degree bend or large radius 180-degree curve in addition to outlet connection. Support flexible duct at connections to air outlets to maintain minimum recommended bend radius.
 3. Seal flexible duct connections to rigid ductwork with draw bands to the pressure class of the rigid duct system.
 4. Flexible duct connections between medium pressure ductwork and air terminal units are prohibited.
 5. Flexible ductwork is prohibited in inaccessible locations, such as above "hard" ceilings.
 6. Flexible ductwork is prohibited at penetrations through walls.
 7. Flexible ductwork is prohibited at exhaust air inlets.
- C. Volume Dampers:
1. Provide air volume dampers at each low-pressure duct main and branch take-off for proper air balancing.
 2. Locate dampers a minimum of 10 feet from diffusers except where shown otherwise.
 3. Volume dampers are not to be installed in medium pressure, variable air volume systems.
- D. Penetrations:
1. Coordinate mechanical penetrations with architectural and structural construction details prior to installation. Provide reinforcement around sleeves as required.
 2. Provide compatible materials, fasteners, adhesives, sealants, and other products required for proper installation.
 3. Penetrations through fire rated assemblies to be UL listed.
 4. Penetrations through smoke partitions and barriers to resist passage of smoke.
 5. Other penetrations to have acoustical seals.
- E. Acoustical Lined Ductwork:
1. Provide standard one inch thick acoustically lined ductwork as indicated using the acoustical liner material specified. Attach the lining material to the ductwork in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible. Provide thicker acoustical lining where specifically noted.
 2. Duct dimensions indicated are net free-area duct dimensions. Add twice the liner thickness to obtain outside duct dimensions.
 3. Sleeve acoustical duct penetrations through full height walls perpendicular to wall surface. Provide 1/2-inch minimum gap between sleeve and duct. Fill gap with mineral wool backer and seal each side of penetration with acoustical sealant.

3.04 SITE QUALITY CONTROL

- A. Verify accessibility to ventilation system components for maintenance, adjustment and cleaning.

3.05 ADJUSTING

- A. Adjust and balance dampers in accordance with Section 23 05 93 - Testing. Adjusting

and Balancing.

3.06 CLEANING

- A. Prior to building occupancy and after ventilating systems are complete and functional, verify cleanliness of ventilating system ductwork and AHU. Verification shall comply with the inspection method(s) outlined in the National Air Duct Cleaners Association (NADCA) Standard for Assessment, Cleaning, and Restoration of HVAC Systems 2013. Conduct inspection in the presence of a Contracting Agency representative.
- B. If the ductwork and AHU do not comply with the standard for cleanliness, clean the affected ductwork as follows:
 - 1. Small systems: Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient airflow, clean one half of system completely before proceeding to other half. Protect equipment with potential to be harmed by excessive dirt with temporary filters, or bypass during cleaning.
 - 2. Large systems: Clean duct systems with high power vacuum machines. Protect equipment with potential to be harmed by excessive dirt with filters, or bypass during cleaning.

END OF SECTION

AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Air Diffusers and Registers.
 - 2. Return/Exhaust Grilles.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 20 05 29 - Mechanical Hangers and Supports
 - 3. 23 05 93 - Testing, Adjusting and Balancing
 - 4. 23 31 00 - Ducts and Accessories

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Codes and Standards:
 - 1. See Section 20 00 00 - Mechanical General Requirements.
 - 2. SMACNA HVAC Duct Construction Standards - Metal and Flexible Fourth Edition 2021.
 - 3. ARI Standard 890-2001 - Air Diffusers and Air Diffuser Assemblies.
 - 4. MOA Handout A.04 - Suspended Ceilings Industry Standard Construction, May 1, 2008.

1.05 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide product performance characteristics as specified or scheduled on drawings.

1.06 PRE-INSTALLATION MEETINGS

- A. See Section 20 00 00 - Mechanical General Requirements.

1.07 SUBMITTALS:

- A. See Section 20 00 00 - Mechanical General Requirements for general submittal requirements for the items listed below, supplemented with the additional requirements listed.
- B. Product Data: Air outlets and inlets performance data at operating conditions.

C. Installation, Operation and Maintenance (IO&M) Manuals.

1.08 CLOSEOUT SUBMITTALS:

A. See Section 20 00 00 - Mechanical General Requirements.

1.09 QUALITY ASSURANCE:

A. See Section 20 00 00 - Mechanical General Requirements.

1.10 DELIVERY, STORAGE AND HANDLING

A. See Section 20 00 00 - Mechanical General Requirements.

1.11 WARRANTY

A. Manufacturer Warranty: See Section 20 00 00 - Mechanical General Requirements, for general mechanical warranty requirements.

PART 2 - PRODUCTS

2.01 AIR DIFFUSERS AND REGISTERS

A. Manufacturers:

1. Titus (Basis of Design).
2. Price.
3. Nailor Industries Inc.
4. Any other manufacturer meeting the requirements of the Contract Documents. Substitution request not required.

B. Performance/Design Criteria: As scheduled.

C. Finishes: Standard white, baked enamel or powder coated finish suitable for field application of custom finish color as required.

D. Accessories:

1. Equalizing grids.
2. Earthquake tabs.

E. Correlate diffuser style, dimension, and fit with ceiling. Provide diffusers with modules of the proper size to match the suspended ceiling layout or with appropriate factory provided frame for surface mounting.

2.02 RETURN/EXHAUST GRILLES

A. Manufacturers:

1. Titus (Basis of Design).
2. Price.
3. Nailor Industries Inc.
4. Any other manufacturer meeting the requirements of the Contract Documents. Substitution request not required.

B. Performance/Design Criteria: As scheduled.

C. Finishes: Standard white, baked enamel or powder coated finish suitable for field application of custom finish color as required.

D. Accessories: Earthquake tabs.

E. Correlate grille style, dimension, and fit with ceiling. Provide grilles with modules of the proper size to match the suspended ceiling layout or with appropriate factory provided frame for surface mounting.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Removal: Remove existing air diffusers, registers and grilles designated for relocation and reuse after repair and cleaning.

3.02 INSTALLATION

- A. General:
 - 1. Install products in compliance with the manufacturer's written installation instructions.
 - 2. Connect air outlets, registers, and grilles to ventilation duct systems in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- B. Air Diffusers, Registers and Grilles:
 - 1. Install air diffusers, registers and return/exhaust grilles at the locations shown.
 - 2. Orient and adjust diffusers to provide the throw directions indicated.
 - 3. Provide appropriate borders for the ceiling, wall, or floor construction type.

3.03 REPAIR/RESTORATION

- A. Refer to Section 20 00 00 - Mechanical General Requirements for general repair/restoration requirements.

3.04 SITE QUALITY CONTROL

- A. Site Tests and Inspections: Prior to insulating louver intake and exhaust/relief plenums, with applicable fans shutdown, lightly spray water into louver from building exterior such that water enters plenums. Verify that the water readily drains out of louver drain holes without pooling and that no visible leakage is present. Repair and retest as necessary until performance requirements are met.

3.05 CLEANING

- A. Clean exposed surfaces of air outlets and inlets, with water and mild soap or detergent not harmful to finish, in order to remove fingerprints and dirt.

END OF SECTION

TERMINAL HEATING AND COOLING UNITS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Fintube radiation.
- B. Related Sections:
 - 1. 20 00 00 - Mechanical General Requirements
 - 2. 20 05 05 - Mechanical Demolition
 - 3. 20 05 29 - Mechanical Hangers and Supports
 - 4. 20 05 48 - Mechanical Vibration and Seismic Control
 - 5. 20 05 53 - Mechanical Identification
 - 6. 20 07 00 - Mechanical Insulation
 - 7. 23 05 93 - Testing, Adjusting and Balancing
 - 8. 23 21 13 - Hydronic Piping and Specialties

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Codes and Standards: See Section 20 00 00 - Mechanical General Requirements.
- B. Abbreviations, Acronyms and Definitions:
 - 1. Refer to Division 1 for general abbreviations, acronyms, and definitions.
 - 2. Refer to Section 20 00 00 - Mechanical General Requirements for general mechanical related definitions.
 - 3. Refer to Mechanical Drawings legend sheet for general mechanical related abbreviations.

1.05 SYSTEM DESCRIPTION

- A. Design Requirements: Provide terminal heating and cooling units, piping, appurtenances, and controls to automatically maintain interior temperature setpoint for each area of the building.
- B. Performance Requirements: Provide performance and output shown or scheduled on drawings.

1.06 PRE-INSTALLATION MEETINGS

- A. See Section 20 00 00 - Mechanical General Requirements.

1.07 SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements for general submittal requirements for the items listed below, supplemented with the additional requirements listed.
- B. Product Data:
 - 1. Submit product literature for items specified in Part 2 and those products required by the performance standards of this section. Literature clearly annotated to indicate specified salient features and performance criteria.
 - 2. Include the following:
 - a. Performance characteristics as scheduled.
 - b. Enclosure style, material and grille arrangement.
 - c. Dimensional data.
- C. Shop Drawings:
 - 1. For custom architectural fintube heating enclosures, provide shop drawings which include:
 - a. Custom enclosure dimensions and method of construction.
 - b. Fintube location and support method to include expansion/contraction compensation.
 - c. Inlet and outlet grille model and fastening method.
 - 2. Submit schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and comparison of specified heat required to actual heat output provided.
 - 3. Indicate mechanical and electrical service locations and requirements.
- D. Samples:
 - 1. Provide color samples of fintube and cabinet unit heater enclosures.
 - 2. Colors to be selected by the Contracting Agency.
- E. Provide certificates, manufacturer's instructions, and manufacturer's field reports for Quality Assurance/Control Submittals:
 - 1. Provide a complete manufacturer's written installation, operation and maintenance manual for each type of installed equipment.
 - 2. Clearly annotate the manual to indicate applicable information for the specific equipment model(s) installed.
 - 3. Included with the manual one copy of the completed start-up and operation checklist. The checklist shall include:
 - a. Printed names and signatures of the installers.
 - b. Documentation from Manufacturer's representative and Contracting Agency that the equipment has been properly installed and is fully operational, thus validating the equipment warranty.
- F. Closeout Submittals:
 - 1. Project Record Documents: Record actual locations of components and locations of access doors in terminal unit cabinets required for access or valves.
 - 2. Operation and Maintenance (IO&M) Manuals:
 - a. Refer to Section 20 00 00 - Mechanical General Requirements, for IO&M Manual formatting requirements and number of copies required.
 - b. Provide copies of approved submittal information for inclusion within the project IO&M Manual. Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, parts listings, and spare parts list.

1.08 CLOSEOUT SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements.

1.09 MAINTENANCE MATERIAL SUBMITTALS

- A. See Section 20 00 00 - Mechanical General Requirements.

1.10 QUALITY ASSURANCE

- A. See Section 20 00 00 - Mechanical General Requirements.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. See Section 20 00 00 - Mechanical General Requirements.

1.12 WARRANTY

- A. Manufacturer Warranty: See Section 20 00 00 - Mechanical General Requirements, for general mechanical warranty requirements.

PART 2 - PRODUCTS

2.01 FINTUBE RADIATION

- A. Description: Radiation heating terminal units consisting of continuous finned tubing with or without metal enclosure.
- B. Heating Elements:
 1. Seamless copper tubing suitable for soldered fittings (as scheduled).
 2. Mechanically expanded, evenly spaced aluminum fins (as scheduled).
- C. Element Hangers: Elements shall be supported by sliding or rolling brackets designed to provide for unrestricted longitudinal movement and noiseless expansion. Hangers from the upper portion of the back panel which shall be of sufficient length to accommodate expansion and contraction of the element without distortion of the fins. Hangers shall be designed to support the element clear of all portions of the enclosure and shall not depend upon any frictional device for attachment. Hangers are not applicable to more than one element tier. Provide an approved expansion compensator for each 20 feet or greater of element including bare pipe connections.
- D. Enclosures: Configuration and dimensions as scheduled and to include:
 1. Minimum metal thickness: 14 gauge.
 2. Full back panel with vertical stiffeners and elements supports.
 3. Lower edge of enclosure braced to element supports and/or back panel.
 4. Concealed tongue and groove type stiffener joints between enclosure sections.
 5. Wall to wall enclosure or end covers as shown.
 6. Support cabinet rigidly to wall or on floor mounted brackets at three feet on center maximum spacing.
- E. Finish: Factory applied baked enamel finish. Colors to be selected by the Contracting Agency.
- F. Damper: Where not thermostatically controlled, provide knob-operated internal damper at enclosure air outlet.
- G. Access Doors: For otherwise inaccessible valves, provide factory made permanently hinged access doors integral with cabinet.
- H. Rated heat output shall be determined in accordance with I-B-R procedures. Unless otherwise stated, the heat output requirements listed in the Schedule are standard catalog ratings for hot water at a tube velocity of three feet per second. Corrections for velocity and glycol solutions have been included in calculations to determine element length and flow volume.
- I. Capacity: As scheduled.
- J. Manufacturers: Sterling, Modine, Rittling, Trane, Vulcan, Slant fin, JAGA.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protection: Cover equipment and plug piping connections to protect components from construction dirt and debris.
- B. Preparation: Prior to installation of terminal units, make sure wall construction is complete enough to correctly locate and mount units.

3.02 INSTALLATION

- A. Install terminal equipment in accordance with manufacturer's instructions.
- B. Install equipment exposed to finished areas after walls and ceilings are finished and painted.
- C. Finned Tube Radiation: Locate on outside walls and run cover continuously wall-to-wall unless otherwise indicated. Center elements under windows. Where multiple windows occur over units, divide element into equal segments centered under each window. Install end caps where units butt against walls.
- D. Hydronic Units:
 - 1. Provide accessible ball type isolation valves on supply and return lines to each terminal unit to allow for unit drain down and repair.
 - 2. Provide low-point drain valve that allows for complete gravity draining of terminal unit.
 - 3. Provide balancing valve as specified elsewhere.
 - 4. Provide high-point automatic air vent as specified elsewhere.
- E. Access Doors: Install such that a drain hose may be easily connected to each drain line hose bibb, allowing the applicable portion of the system to be completely drained.
- F. Install balancing valves and serviceable products for heating terminal units to be operable and adjustable without removal of the finish cover.
- G. Provide pressure and temperature test plugs on both sides of heat transfer elements to measure the drop across runs of heat transfer elements.

3.03 CONSTRUCTION

- A. Interface with Other Work:
 - 1. Coordinate and sequence installation of terminal heating and cooling units with trades responsible for portions of this and other related sections of the Project Manual.
 - 2. Rework required as a result of failure to follow the manufacturer's written installation instructions or to properly coordinate with related Work shall be completed at no additional expense to the Owner.

3.04 REPAIR/RESTORATION

- A. Repair any product components broken during installation or startup with replacement parts supplied by the product manufacturer.
- B. Substitute replacement parts from other manufacturers are not acceptable.

3.05 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services:
 - 1. Verify units are installed and operational in accordance with the manufacturer's written installation instructions.
 - 2. Both the Contractor and Manufacturer's Representatives shall sign start-up and operational checklist to confirm proper unit installation and operation.

3.06 ADJUSTING

- A. Adjust functional components for proper operation in accordance with manufacturer's recommendations, or as otherwise directed.
- B. Coordinate and work directly with the Testing, Adjusting and Balancing Agency to provide systems in proper operating order. Make corrections and adjustments as required by the Balancing and Testing Agency in a timely manner.

3.07 CLEANING

- A. After construction is completed (including painting), and prior to initial start-up, clean and wipe down exposed surfaces of units. Vacuum clean coils and inside of cabinets and enclosures.
- B. Touch up marred or scratched surfaces of factory finished cabinets and enclosures, using finish materials furnished by manufacturer.

3.08 DEMONSTRATION AND START-UP

- A. Start-up and operate terminal heating and cooling units in accordance with the manufacturer's written installation and operation manual check list.
- B. Demonstrate proper system operation using the building automation system.

END OF SECTION

ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this Section.
- B. This section describes specific requirements, products, and methods of execution, which are typical throughout the electrical work of this project. Additional requirements for the specific systems may modify these requirements.
- C. This Section applies to all Divisions 26, 27 and 28 and is part of all other Divisions 26, 27 and 28 Sections.
- D. Index of Electrical Specifications:
 - 1. 26 00 00 - Electrical General Requirements
 - 2. 26 05 19 - Low Voltage Electrical Power Conductors and Cables
 - 3. 26 05 26 - Grounding and Bonding for Electrical Systems
 - 4. 26 05 29 - Hangers and Supports for Electrical Systems
 - 5. 26 05 33 - Raceway and Boxes for Electrical Systems
 - 6. 26 05 53 - Identification for Electrical Systems
 - 7. 26 09 43 - Network Lighting Controls
 - 8. 26 27 26 - Wiring Devices
 - 9. 26 50 00 - Lighting Fixtures
 - 10. 27 20 10 - Telecom Distribution System
 - 11. 28 46 00 - Fire Detection and Alarm

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. Codes: Perform work in strict accordance with applicable national, state and local codes; including, but not limited to the latest legally enacted editions of the following specifically noted requirements:
 - 1. NFPA 70, National Electrical Code - NEC.
 - 2. ANSI-C2, National Electrical Safety Code - NESC.
 - 3. International Building Code - IBC.

4. International Fire Code - IFC.
 5. Underwriters Laboratory (UL) or approved equal.
- B. Standards: Reference to the following standards infers that installation, equipment and material shall be within the limits for which it was designed, tested and approved, in conformance with the current publications and standards of the following organizations:
1. American National Standards Institute - ANSI.
 2. American Society for Testing and Materials - ASTM.
 3. American Society of Heating Refrigerating and Air Conditioning Engineers - ASHRAE.
 4. Institute of Electrical and Electronics Engineers - IEEE.
 5. Insulated Cable Engineers Association - ICEA.
 6. National Electrical Manufacturers' Association - NEMA.
 7. National Fire Protection Association - NFPA.

1.05 DEFINITIONS

- A. "Accessible" means arranged so that an appropriately dressed man, 6 feet-2 inches tall, weighing 250 pounds, may approach the area in question with the tools and products necessary for the work intended and may then position himself to properly and safely perform the task to be accomplished, without disassembly or damage to the surrounding installation.
- B. "Authority Having Jurisdiction" is the individual official, board, department, or agency established and authorized by the political subdivision created by law to administer and enforce the provisions of the Code as adopted or amended.
- C. "As Specified" denotes a product, system, or installation that:
1. Includes all of the salient characteristics identified in the Drawings and Specifications;
 2. Meets all of the requirements of the "Basis of Design"; and
 3. Is produced by a manufacturer listed as acceptable on the Drawings or in the Specifications.
- D. "Basis of Design" refers to products around which the design was prepared. Some or all of the particular characteristics of Basis of Design products may be critical to the fit or performance of the completed installation. Such characteristics are often subtle. Where substitutions are made to products that are the Basis of Design, the Contractor is alerted that nominally acceptable substitutions may produce undesirable side effects such as switchboards that no longer fit the space due to increased product dimensions. The Contractor is responsible for resolving all impacts of substitutions. Approval of a substitution request does not relieve the Contractor of complying with the design intent and all Codes.
- E. "Contracting Agency" Owner or as defined in the General Conditions of the Contract.
- F. "Demolish" means to permanently remove a component, equipment, or system and its appurtenances with no intent for reuse and to properly dispose of it.
- G. "Furnish" means to purchase material as shown and specified and cart the material to an approved location at the site or elsewhere as noted or agreed to be installed by supporting crafts.
- H. "Install" means to set in place and connect, ready for use and in complete and properly operating finished condition, material that has been furnished.
- I. "Product" is a generic term that includes materials, equipment, fixtures and any physical item used on the project.
- J. "Provide" means furnish all products, labor, subcontracts, and appurtenances required and install to a complete and properly operating, finished condition.
- K. "Remove" means to remove a component, equipment, or system and its appurtenances and either store it for re-installation, reuse, or turn it over to the Contracting Agency.
- L. "Rough-in and Connect" means provide an appropriate system connection such as conduit with junction boxes, wiring, switches, disconnects, etc., and wiring connections. Equipment

furnished is received, uncrated, assembled, and set in place under the Division in which it is specified.

- M. "Serviceable" means arranged so that the component or product in question may be properly removed, and replaced without disassembly, destruction or damage to the surrounding installation. "Serviceable" components shall be "accessible".
- N. "Shop Drawings" are dimensioned working construction drawings drawn to scale to show an entire area of work in sufficient detail to demonstrate service and maintenance clearances and complete coordination of all trades.
- O. "Substitution" is a product, system or installation that is not by a listed manufacturer or does not conform to all salient characteristics identified in the Contract Documents, but which the Contractor warrants meets all specific requirements listed in the Contract Documents.
- P. "System Drawing" is a diagrammatic engineered drawing that shows the interconnection and relationship between products to demonstrate how the products interact to accomplish the function intended. Examples of system drawings include control and instrumentation diagrams, and wiring diagrams. Some drawings, such as dimensioned and complete Fire Suppression Drawings may be both System Drawings and Shop Drawings.

1.06 PERFORMANCE REQUIREMENTS

- A. Provide labor, products and services required for the complete installation, checkout and startup of electrical systems shown and specified. Where the work of several crafts is involved, coordinate related work to provide each system in complete and in proper operating order.
- B. Lay out the work in advance and avoid conflict with other work in progress. Physical dimensions shall be determined from existing conditions. Verify locations for junction boxes; disconnect switches, stub-ups, etc., for connection to equipment furnished by others, or in other Divisions of this Work.
- C. Refer to the "Suggested Coordination Schedule" in Section 20 00 00 - Mechanical General Requirements.
- D. Cooperate with others involved in the project, with due regard to their work, to promote rapid completion of the entire project.
- E. Coordinate installation of panels, equipment, system components, and other products to provide proper service areas and access for items requiring periodic maintenance inspection or replacement.
- F. Reference to a specific manufacturer's product (even as "Basis of Design") does not necessarily establish acceptability of that product without regard to compliance with all other provisions of these specifications.
- G. Local Conditions: The Contractor shall thoroughly familiarize himself with the work as well as the local conditions under which the work is to be performed. Schedule work with regard to seasons, weather, climatic conditions and other local conditions which may affect the progress and quality of the work.
- H. Utility Coordination: Coordinate work with the serving utilities (electrical, telephone, cable television, etc.) and provide equipment and installation in accordance with the respective utility requirements. Meet with the serving utilities and coordinate the installation and location of the services. Provide a written statement of approval from each serving utility. Provide trenching from telephone and television stub out locations to property line in accordance with respective utility requirements.
- I. Demolition: Coordinate related demolition in support of the project. Restore circuits and systems, which are to remain, but which are affected in any way by demolition Work. Conduct a site visit prior to bid to determine Scope. Refer to Part 3 of this Section for execution requirements.

1.07 SUBMITTALS

- A. Refer to Division 1 for general submittal, closeout submittal and product substitution requirements. In addition, prepare Divisions 26, 27 and 28 submittals in accordance with the following.
- B. Specification section drawings, calculations, and products shall be complete and submitted together in one package.
- C. General:
 - 1. The Contracting Agency's obligation to review submittals and to return them in a timely manner is conditioned upon the prior review and approval of the submittals by the Contractor as required by the Construction Contract.
 - 2. Streamlining: in many instances, the products, reference standards, and other itemized specifications have been listed without verbiage. In these cases, it is implied that the Contractor shall provide the products and perform in accordance with the references listed.
 - 3. Submittal review is for general design and arrangement only and does not relieve the Contractor from any of the requirements of the Contract Documents.
 - 4. Submittals will not be checked for quantity.
 - 5. Submittals will not be exhaustively checked for dimension or fit, or for proper technical design of manufactured equipment. Provision of a complete and satisfactory working installation is the responsibility of the Contractor.
 - 6. Furnish suppliers with the applicable portions of the Contract Documents and review and verify that the suppliers' submittals clearly represent products which comply with the Contract Documents.
 - 7. Unless requested by the Owner; provide submittals electronically.
 - 8. Unless otherwise noted; Provide both hard copies and electronic submittals of Installation, Operation, and Maintenance Manuals (IO&Ms).
- D. Electronic Submittals:
 - 1. Submittals may be in electronic (PDF) format.
 - a. Electronic submittals shall follow the organization and formatting required for paper submittals.
 - 1). Provide electronic bookmarks within the PDF document in place of tabs and sub- tabs.
 - 2). If individual PDF files are provided for each product or shop drawing sheet, organize files into folders and name files and folders to correspond with applicable specification sections or drawing titles.
 - b. If submittal is a scanned document, run the optical character recognition OCR function to ensure the document is searchable and can be copied and pasted.
 - c. Electronic submittals may be transmitted via Email, disc or download from a project or construction Website.
- E. Coordination:
 - 1. Create and maintain a master submittal log for all items submitted in Divisions 26, 27 and 28. Submit master submittal log with first submittal.
 - 2. Prior to submission for approval hold a meeting of all trades to review all shop drawings and submittals. All trades shall cross-check all shop drawings and submittals for conflicts, clearances, physical space allocation and routing, discrepancies, dimensional errors, omissions, contradictions, departures from the Contract requirements, correct electrical/mechanical services and connections, and provisions for commissioning.
 - 3. Revise, correct, and appropriately annotate submittals prior to submission for approval.
 - 4. A current copy of approved submittals and the submittal log shall be kept at the job site.
- F. Product Submittals
 - 1. General: This section describes in detail the preparation of electrical product submittals.

Submittals not provided as described shall be rejected without review. This procedure is designed to accelerate and improve the accuracy of the technical review process, as well as, simplify the preparation of the Installation, Operation, and Maintenance Manuals (IO&Ms) during project closeout.

2. Submittal Organization:
 - a. Organize product submittal information in the same order as the products are specified to simplify the technical review process. Provide a separate tabbed divider for each Divisions 26, 27 and 28 specification section. Provide the typed section number on each tab.
 - b. Within each section, organize the product information in the same order as the products are specified in Part 2 of each applicable specification section. Provide sub-tabs within each section for each separate product article. Provide the typed product article number on each tab.
 - c. Provide product submittal information for each product specified in 8-1/2" x 11" format. Fold-out 11" x 17" format is also acceptable.
 - d. If a particular specified product is being omitted from the product submittal or will not be used for the project, provide a single sheet within the article tab identifying the product and annotated with a brief reason why the product is not being submitted, for example: "NOT USED," "NO SUBMITTAL REQUIRED," "TO BE SUBMITTED BY (PROVIDE DATE)," etc. This will inform the reviewer that the product was not overlooked.
 - e. Partial submittals from individual subcontractors may be provided which cover a particular sub-contractor's scope of work. In this case, arrange partial submittals by system classification such as: LIGHTING, POWER DISTRIBUTION, FIRE ALARM, ACCESS CONTROL SYSTEM, etc. Within each system classification, arrange product submittals by specification section, as described, such that each specification section can easily be reorganized into a master set of Divisions 26, 27 and 28 product submittals organized by specification section. This will greatly simplify the preparation of IO&M manuals as described below.
 - f. Bind product submittal information in 3 inch wide, hard backed, loose leaf, 3 ring binders with clear front and spine insert pockets. Divide information into multiple volumes such that the pages in each binder rest naturally on one side of rings.
 - g. Provide a master table of contents at the front of each volume which lists the Divisions 26, 27 and 28 specification sections and indicates which sections are located within each volume.
 - h. Provide a table of contents within each section which lists the Part 2 products for that section in the same order as the applicable specification section.
 - i. Provide identical cover and spine inserts for each product submittal volume.
 - j. For multiple volumes, label each volume. Include the following typed information on the front cover and spine inserts of each volume:
 - 1). The Contracting Agency Name
 - 2). Project Name
 - 3). Contractor Name
 - 4). Subcontractor Name preparing the submittal.
 - 5). Date that the submittal or resubmittal was initiated.
 - 6). "Electrical Product Submittals", etc. as appropriate.
 - 7). "Volume 1 of X, Volume 2 of X," etc.
3. Product Information:
 - a. Indicate manufacturer's name and address, and local supplier's name, address, phone number.
 - b. Indicate each product as "Basis of Design", "As Specified" or as "Proposed Substitution."
 - c. Identify Catalog designation and/or model number.
 - d. Neatly annotate each salient characteristic and design options of the product to demonstrate compliance with the Contract Documents to include: Scheduled information, drawing information and specified information. Clearly indicate product

- deviations from the Contract Documents and mark out non-applicable items on generic "cut-sheets."
- e. Include manufacturer provided dimensioned equipment drawings with mechanical and electrical rough-in connections.
 - f. Include operation characteristics, performance curves and rated capacities.
 - g. Include motor characteristics and wiring diagrams for the specific system.
 - h. Provide basic manufacturer's installation instructions.
4. Provide coordination data to check protective devices.
 5. Provide information required to verify compliance with the short circuit withstand and interrupting ratings, as shown on the Drawings or further stated in these Specifications.
 6. Provide certification that all data shown on the Drawings or further stated in these Specifications concerning available short-circuit currents has been confirmed with the serving Electric Utility.
 7. Product Substitutions:
 - a. Clearly indicate both in the section table of contents and on the individual product submittal information each proposed substitution, deviation or change from the product as described in the Contract Documents.
 - b. Submittal approval does not include substitutions, deviations or changes from the requirements of the Contract Documents unless they are specifically itemized and approved. The term "No Exceptions Taken" will not apply to substitutions, deviations or changes not clearly identified.
 - c. Provision of a satisfactory working installation of equal quality to the system as described in the Contract Documents shall be the responsibility of the Contractor.
 - d. Correct unapproved deviations from the Contract Documents discovered in the field as directed by the Contracting Agency at no additional cost to the Owner.
- G. System Drawings:
1. Submit System Drawings for dynamic elements/systems of the project which are performance specified to include but not limited to: Fire Alarm Systems, Lightning Protection Systems and stand-alone packaged equipment.
 2. Prepare system drawings on full sized sheets of the same size as the original construction drawings.
 3. Include with each system a sequence of operation narrative which describes each mode of system operation in sufficient detail to demonstrate compliance with the Contract Documents to the satisfaction of the Contracting Agency.
- H. Shop Drawings:
1. General:
 - a. The Contract Documents are not intended for nor are they suitable for use as shop drawings. Do not use Contract Drawings for direct fabrication or installation of products or equipment.
 - b. Divisions 26, 27 and 28 products and systems shall not be installed without shop drawings approved by the Contracting Agency.
 - c. Rework, changes or additional engineering support required as a result of the installation of products and systems prior to the approval of applicable shop drawings by the Contracting Agency shall be provided at the Contractor's expense.
 2. Preparation:
 - a. Review each Divisions 26, 27 and 28 specification section and identify the project's shop drawing requirements.
 - b. Prepare shop drawings on full sized sheets of the same size as the original construction drawings.
 - c. Arrange shop drawings to scale, showing dimensions where accuracy of location is necessary for coordination or communication purposes.
 - d. Incorporate the actual dimensions and configurations of the products and systems approved through the product submittal process into the shop drawings.

ELECTRICAL GENERAL REQUIREMENTS

Division 26

Section 26 00 00

- e. Provide dimensioned maintenance clearance areas around each product as recommended by the manufacturer.
 - f. Meet with and coordinate Divisions 26, 27 and 28 work with the interrelated work of other trades including Architectural, Civil, Structural, and Mechanical to identify and resolve potential conflicts.
 - g. Clearly identify and provide recommendations to resolve major conflicts which may impact the design of the systems as shown. Resolve such conflicts during the shop drawing review process.
 - h. In cases where one or more equipment items in a mechanical or electrical room or space differ in dimensions or configuration from Basis of Design equipment, the working drawing shall show the entire area. The drawing shall be dimensioned to indicate that required aisle ways and maintenance clearances are being maintained to at least the degree shown on the Contract Drawings.
 - i. Provide shop drawings for all products, systems, system components, and special supports that are not a standard catalog product and which may be fabricated for the Contractor or by the Contractor. In addition, provide shop drawings for:
 - 1). Routing and interdisciplinary coordination of groups of conduits numbering more than one and over two-inch trade size.
 - 2). Fire Alarm System.
 - 3). PA/Intercom Systems.
 - 4). Lighting Controls.
 - 5). Telecom Distribution System.
 - 6). Cable Trays.
 - 7). Where noted on the drawings.
 - 8). Where noted in other Divisions 26, 27 and 28 sections.
 - j. Submit Shop Drawings electronically.
 - k. Record Shop Drawings: Provide a copy of the final, corrected, approved shop drawings for the project, updated to show as-built conditions. Drawings shall indicate exact device locations and conduit and wire routing. Deliver electronic files to the Contracting Agency. Refer to other specification sections for additional system specific requirements.
3. Shop Drawing Submittal:
- a. Submit dimensioned shop drawings as specified to demonstrate proper planning and sequencing of the applicable trades for the installation and arrangement of Divisions 26, 27 and 28 with respect to other interrelated work.
 - b. Installation conflicts arising from the failure to properly coordinate the work of related trades shall be resolved at the Contractor's expense.
- I. Record Drawings
- 1. General: As the Work progresses, neatly annotate a designated and otherwise unused, set of Divisions 26, 27 and 28 Contract Drawings to show the actual locations and routing of Divisions 26, 27 and 28 Work and the terminal connection points to related Work. As a minimum, include the following:
 - a. Annotate record drawings to incorporate each applicable addendum.
 - b. Annotate record drawings as directed by each applicable Request for Information (RFI) and accepted Change Order Proposal.
 - c. Modify record drawings to show actual equipment sizes and locations.
 - d. Provide fully dimensioned locations for permanently concealed conduits (i.e. conduit cast in concrete or buried underground/underslab).
 - e. Show routing of work in permanently concealed blind spaces within the building.
 - f. Maintain drawings in an up-to-date fashion in conjunction with the actual progress of installation. Accurate progress mark-ups shall be available on-site for examination by the Contracting Agency or his representative at all times.
 - 2. Preparation:
 - a. Neatly annotate record drawings to provide clear interpretation to support electronic drafting by a third party.
 - b. Tape electronic sketches from addendums and/or RFIs directly to the record

- drawings as overlays.
- c. Annotate the record drawings in colored pencil using the same symbols and abbreviations as indicated in Divisions 26, 27 and 28 legends and schedules of the Contract Drawings.
 - 1). Red to add information.
 - 2). Green to delete information.
 - 3). Blue to provide additional clarifying information which is not to be drafted.
 - d. After submittal to the Contracting Agency, provide additional clarification, information or rework as necessary to support the accurate interpretation and electronic drafting of the record drawings.
3. Submittals:
- a. Provide dimensioned underslab record drawings to the Contracting Agency prior to pouring the slab. For slabs poured in multiple sections, provide record drawings for the applicable slab sections to the Contracting Agency prior to each pour.
 - b. Provide complete record drawings for concealed areas (i.e. above lay-in and hard ceilings and inside walls) to the Contracting Agency prior to concealment.
 - c. Provide the remaining portion of the record drawings for exposed areas to the Contracting Agency prior to the final completion of the project.
 - d. Submit wiring diagrams for individual special systems as installed. Identify components and show wire and terminal numbers and connections. **Include diagrams from the shop drawings and submittals**, updated to show as-built condition.
- J. Test Certificates:
1. Review the submittal requirements for Quality Assurance/Control Submittals for each specification section.
 2. Submit copies of design data, test reports, certificates, manufacturer's instructions and field test reports as specified. This information may be included within the Operations and Maintenance (IO&M) Manuals as determined by the Contracting Agency.
- K. Operations and Maintenance (IO&M) Manuals:
1. Provide specific product IO&M information for each section as detailed within each Divisions 26, 27 and 28 section.
 2. Begin the preparation of the electrical Operation and Maintenance Manuals with a complete and fully approved set of electrical product submittals organized, annotated and with the product information as indicated within the "Product Submittals" article for each specification section.
 3. Next, augment each individual product submittal with the written installation, operations and maintenance information for each specific product. Obviously, this type of information is not applicable (or available) for bulk commodities or simplistic products such as conduit or equipment tags, etc.
 4. Maintenance information shall include:
 - a. Preventive maintenance requirements for each product, including the recommended frequency of performance of each preventive maintenance task.
 - b. Instructions for troubleshooting, minor repair and adjustments required for preventive maintenance routines, limited to repairs and adjustments that may be performed without special tools or test equipment and that require no extensive special training or skills.
 - c. Information of a maintenance nature covering warranty items, etc., that have not been discussed in the manufacturers' literature.
 - d. Information data for spare and replacement parts for each product and system. Properly identify each part by part number and manufacturer.
 - e. Recommended spare parts list.
 5. Organize the Operation and Maintenance Manual information by specification section (not by sub-contractor) with a tabbed divider separating each section. Provide the typed

- section number on each tab.
6. Within each section, organize the product information in the same order as the products are specified in Part 2 of each applicable section. Provide sub-tabs within each section for each product. Provide the typed product article number on each tab.
 7. Bind the information in identical, 3 inch wide; hard backed loose leaf 3 ring binders with clear front and spine insert pockets. Divide information into multiple volumes so that the pages in each binder rest naturally on one side of rings.
 8. Provide a master table of contents at the front of each volume which lists the Divisions 26, 27 and 28 specification sections and indicates which sections are located within each volume.
 9. Provide a table of contents within each section which lists the Part 2 products for that section in the same order as the applicable specification section.
 10. Provide identical cover and spine inserts for each IO&M manual volume.
 11. For multiple volumes, label each volume.
 12. Include the following typed information on the front cover and spine inserts of each volume:
 - a. The Contracting Agency Name.
 - b. Project Name.
 - c. "Electrical Operations and Maintenance Manual".
 - d. "Volume 1 of X, Volume 2 of X," etc.
 13. Submit copies of all Operation and Maintenance Manuals in electronic format (Adobe PDF). Provide hard copies of the final approved Operation and Maintenance Manuals – quantity as required per

1.08 QUALITY ASSURANCE

- A. Qualifications: Perform the Work using qualified workmen that are experienced and usually employed in the trade.
- B. Product Testing and Certification:
 1. Nationally Recognized Testing Laboratory (NRTL) Labeling: Electrical equipment and conductors shall be "Approved," "Certified," "Identified," or "Listed" and "Labeled" to establish that the electrical equipment is safe, free of electrical shock and fire hazard, and suitable for the purpose for which it is intended to be used. The manufacturer shall have the specific authorization of one of the Occupational Safety and Health Administration (OSHA) approved Nationally Recognized Testing Laboratories (NRTLs) in accordance with the applicable national standards to label the equipment as suitable.
 2. Further details on the specific NRTLs, as well as the product standards that they are specifically recognized to evaluate equipment in accordance with, can be found on the OSHA Web site: <http://www.osha.gov/dts/otpca/nrtl/>.
- C. Drawings and Specifications:
 1. The Drawings and specifications are complementary. Do not scale the Drawings. Locations of devices, fixtures, and equipment are approximate unless dimensioned.
 2. The Drawings are partly diagrammatic and do not show precise routing of conduits or exact location of all products and may not show in minute detail all features of the installation; however, provide all systems complete and in proper operating order.
 3. Drawing symbols used for basic materials, equipment and methods are commonly used by the industry. Special items are identified by a supplementary list of graphical illustrations or called for on the Drawings or in the specifications.
- D. Tests and Inspections:
 1. Schedule, obtain, and pay for permits and fees required by local authorities and by these specifications.
 2. Request for Tests: Notify the Contracting Agency a minimum of 72 hours in advance of tests. In the event the Contracting Agency does not witness the test, certify in writing that all specified tests have been made in accordance with the specifications.

3. Deficiencies: Immediately correct deficiencies that are evidenced during the tests and repeat tests until system is approved. Do not cover or conceal electrical installations until satisfactory tests are made and approved.
4. Operating Tests: Upon request from the Contracting Agency, place the entire electrical installation and/or any portion thereof, in operation to demonstrate satisfactory operation.
5. The Contracting Agency may inspect and approve sample installation of systems and equipment prior to general installation of units.
6. Test Witness: Arrange for the Contracting Agency to witness tests. The Contracting Agency may waive witnessing any specific test at its discretion.
7. Operating Instructions: Prior to final acceptance, instruct an authorized representative of the Owner for four hours on the proper operation and maintenance of electrical systems and equipment provided under this contract. This requirement is for several systems and is in addition to special training specified in other sections. Make available a qualified technician for each component of the installation for this instruction. Give these operating instructions after the operation and maintenance manuals have been furnished to the Owner. Submit written certification, signed by the Contractor and an authorized representative of the Owner, that this has been completed.

1.09 SPARE PARTS

- A. Furnish spare parts for systems and equipment as listed in applicable sections of Divisions 26, 27 and 28.
- B. Clearly label each part with name, manufacturers part number, system and/or equipment where used and location.
- C. Deliver parts to location and person designated by the Contracting Agency, in durable storage boxes.
- D. Group cartons containing smaller items by system or application and deliver in an appropriate number of storage boxes.

1.10 WARRANTY

- A. Warranty work shall be promptly coordinated and performed at the Contractor's sole expense. Workmanship, labor and materials (without limitation) in this Division shall be warranted for the longer of the following:
 1. As called for in the General Conditions of the Contract.
 2. For a minimum period of one year from the date of final acceptance.
 3. For the extended warranty period specified in a specific Section under this Division.
- B. Where a specific product carries a longer warranty as a standard offering of its manufacturer, extended warranty coverage beyond these requirements shall be retained by the Owner. The Owner will have recourse back to the manufacturer only in these cases, when the warranty as specified in A above has expired.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT FURNISHED IN DIVISIONS 26, 27 AND 28

- A. Materials furnished and installed in permanent construction shall be new, full-weight, standard in every way, and in first class condition.
- B. Materials shall conform to the standards of an organization acceptable to the Authority Having Jurisdiction and concerned with product evaluation that maintains periodic inspection of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner. Only materials designed for the purpose employed shall be used.
- C. Materials shall be identical with apparatus or equipment that has been in successful operation

for at least two years. Materials of similar class or service shall be of one manufacturer.

- D. Capacities, sizes, and dimensions given are minimums unless otherwise indicated. Systems, materials and equipment proposed for use on this project shall be subject to review for adequacy and compliance with Contract Documents.

2.02 MATERIALS AND EQUIPMENT FURNISHED IN OTHER DIVISIONS

- A. Controls, including conduit, wiring, and control devices required for the operation of systems furnished in other Divisions shall be provided complete under the Division of the Specifications in which the equipment is specified, unless otherwise noted or specified.
- B. Work on the project that falls under the jurisdiction of the electrical trade shall be performed by Licensed Electricians in conformance with the electrical specifications.
- C. Provide complete power connections to equipment including but not limited to feeders, connections, disconnects and motor running overcurrent protection. Where starters are provided as part of packaged equipment, overcurrent heaters shall be provided under Divisions 26, 27 and 28.

PART 3 - EXECUTION

3.01 COORDINATION WITH ROOM NUMBERING

- A. Certain systems provided under this Division rely on identification systems that are based on room names or numbers. Systems labeled in this fashion include, but are not limited to, panelboards, circuit directories, communication and data systems identifiers, fire alarm systems, etc.
- B. The numbering scheme indicated in these Contract Documents is based on room numbers assigned during the design process. The Owner reserves the right to change the numbers prior to substantial completion, and the final names and numbers will not necessarily match those found in the Documents. Obtain from the Owner the final room numbers prior to commencing the numbering of Divisions 26, 27 and 28 systems. Tag and label all system circuits and devices in accordance with the final numbering scheme at no additional cost.

3.02 INSTALLATION

- A. Skilled craftsmen shall install materials and equipment. The norms for execution of the work shall be in conformity with NEC Chapter 3 and the National Electrical Contractors' Association "National Electrical Installation Standards", which herewith is made part of these specifications.
- B. Repair surfaces and furnish all required material and labor to maintain fireproof, airtight and waterproof characteristics of the construction.
- C. Installation of equipment shall be in accordance with manufacturers' instructions.

3.03 MULTIWIRE BRANCH CIRCUITS

- A. Multiwire branch circuits shall not be used on this project. Each branch circuit shall be provided with its own dedicated neutral conductor.

3.04 MOUNTING HEIGHTS

- A. Mounting height shall be to center of box above finished floor (AFF) as noted below unless otherwise shown or indicated. Other mounting heights are indicated on the Drawings by detail. Specific dimensions AFF are shown adjacent to the symbol. Where devices are shown on architectural elevations, the elevation height shall govern.

Lighting switches	48 inches
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ELECTRICAL GENERAL REQUIREMENTS

Division 26
Section 26 00 00

Convenience outlets and similar devices	18 inches (see note below)
Convenience outlets in mechanical, boiler rooms and workrooms	48 inches
Motor controllers	60 inches to top
Panelboards	76 inches to top
Telephone panels	72 inches to top
Bracket lights	84 inches
Exterior WP convenience outlets	24 inches AFG
Clock hanger outlets and clocks	90 inches
Clock/speaker units	90 inches
Speakers	90 inches
Telecommunications (Data/Telephone) outlets	18 inches (see note below)
Range outlets	6 inches (or as required for access through drawer)
Dryer outlets	36 inches
Welder outlets	48 inches
Doorbell push buttons	48 inches
Wall mounted audible and/or visual appliances such as bells, horns, strobes and similar signal devices	90 inches (or 6 inches below ceiling height for ceiling heights less than 96 inches)
Manual fire alarm box	48 inches (or 48 inches to operable part where operable part of device is above centerline of device)
Fire alarm control panel	72 inches to top
Fire alarm graphic annunciator	72 inches to top
Fire alarm text annunciator	60 inches to center
Security Keypad	60 inches to center
Security Card Reader	48 inches to center
Nurse call annunciator	72 inches to top
Nurse call switches	48 inches
Intercom handsets and call-in switches	60 inches
Intercom administrative phone outlets	18 inches (see note below)

- B. NOTE: In locations where baseboard-heating enclosures are to be installed, outlet-mounting height shall be raised to 6 inches above top of enclosure unless otherwise noted on drawings.

3.05 CUTTING & PATCHING

- A. Obtain written permission of the Contracting Agency before cutting or piercing structural members.
- B. Wall and floor penetrations shall be in accordance with Section 26 05 29 - Hangers and Supports.
- C. Holes through existing concrete shall be core drilled. X-ray concrete before core drilling. Do not cut rebar without specific authorization from the Contracting Agency. Seal openings with

UL Listed fire resistant resilient sealant.

3.06 VAPOR RETARDER/BARRIER PENETRATIONS

- A. Provide solid blocking installed flat at all vapor retarder penetrations. Provide flat blocking at the interior face of the exterior stud wall. Blocking shall be a minimum of 4 inches larger than the penetration. Locate the penetration at the centerline of the flat blocking. Secure vapor retarder to blocking.
- B. Seal the interior of raceways penetrating the vapor retarder inside the building. Between point of sealing inside of raceway (typically at junction box or conduit) and vapor retarder penetration, seal conduit joints (connectors and couplings) with vapor retarder tape, paint on sealer or approved means acceptable to Contracting Agency.
- C. To reduce thermal transfer and ensure sealing of raceway, PVC or equivalent conduit shall be used where penetrations of building envelope are made above ground where installation of PVC is allowed by NEC.
- D. Penetrations of the building vapor retarder/barrier caused by the electrical installation shall be minimized, and where they are required, the opening in the vapor retarder/barrier shall be cut smaller than the penetrating object, so that the penetration will be a stretch fit. The penetration shall then be securely sealed with vapor barrier tape or an adhesive or caulk compatible with the surfaces being sealed.
- E. Boxes (electrical boxes, outlet boxes and telecommunication boxes, etc.) penetrating walls with vapor retarder/barriers shall be sealed airtight using STI Series SSP Firestop Putty Pads. Mold putty pads around electrical junction boxes and conduits and behind vapor retarder/barrier to form an airtight seal in accordance with manufacturer's installation instructions.

3.07 FIRE RESISTIVE CONSTRUCTION

- A. Provide "tenting" or other protection acceptable to the Authority Having Jurisdiction for devices or fixtures installed in fire resistive construction (i.e., ceilings, walls, etc.) to maintain the fire resistive rating of the complete assembly.
- B. Where electrical raceways or other features penetrate fire rated building surfaces, they shall maintain the integrity of the building surface being penetrated. This shall be accomplished with either of the following methods:
 - 1. Sealing the penetration with an approved fire rated caulk or putty.
 - a. Fire rated caulk or putty: 3M Fire Barrier Caulk No. CP25, 3M Fire Barrier Moldable Putty, or as approved.
 - 2. A fire rated assembly enclosing the penetration.
 - a. Fire rated assembly: STI EZ Path, or as approved.
 - 3. Firestopping shall be applied according to the manufacturer's recommendations, and in a manner that is listed by a nationally recognized independent testing agency (such as UL) as preserving the fire time rating of the construction.

3.08 PROTECTIVE FINISHES

- A. Take care not to scratch or deface factory finish of electrical apparatus and devices. Repaint all marred or scratched surfaces.
- B. Provide hot dip galvanized components for ferrous materials exposed to the weather.

3.09 SEPARATION OF SYSTEMS

- A. Conductors and equipment of different voltage levels, frequency, current characteristics (AC & DC) or functions (normal vs. emergency, etc.) shall not share the same raceways or enclosures unless specifically shown on the Drawings or approved by the Contracting Agency, or inherently necessary for correct system function (i.e., at transfer switches, transformers,

etc.)

3.10 TESTING

- A. Prior to final test, switches, panelboards, devices and fixtures shall be in place.
- B. Test electrical systems. They shall be free from short circuits and unintentional grounds.
- C. Make changes necessary to balance the actual electrical loads on the complete system. Arrange for balanced conditions of circuits under connected load demands, as contemplated by the normal working conditions. Final load and balance test shall be demonstrated in the presence of the Contracting Agency.
- D. Feeder cables and branch circuit cables larger than #4 AWG shall be megger tested prior to final termination. If conductor fails test, replace wiring or correct defect and retest. Perform a 1,000 volt megohm meter test between the following circuit cables in each raceway:
 - 1. A phase and B phase conductors
 - 2. A phase and C phase conductors
 - 3. B phase and C phase conductors
 - 4. A phase and Grounded (Neutral) conductors
 - 5. B phase and Grounded (Neutral) conductors
 - 6. C phase and Grounded (Neutral) conductors
 - 7. A phase and Equipment Grounding conductors
 - 8. B phase and Equipment Grounding conductors
 - 9. C phase and Equipment Grounding conductors
 - 10. Grounded (Neutral) and Equipment Grounding conductors
- E. Feeder cables shall be megger tested prior to final termination. If conductor fails test, replace wiring or correct defect and retest. Perform a 1,000 volt megohm meter test on each circuit cable rated 600 volts between the conductor and ground. Submit logs of megger readings. The insulation resistance between conductors shall not be less than 100 Megohms.
- F. Furnish one (1) copy of certified test results to the Contracting Agency prior to final inspection.

3.11 STORAGE AND HANDLING

- A. Items shall be delivered and stored in original containers, which shall indicate manufacturer's name, the brand, and the identifying number. Items subject to moisture and/or thermal damage shall be stored in a dry, heated place. Items shall be covered and protected against dirt, water, chemical, ultraviolet (UV) and/or mechanical damage.

3.12 PROTECTION OF MATERIAL AND EQUIPMENT

- A. The Contractor shall be responsible for materials and equipment to be installed under this Contract. The Contractor shall make good at his own cost any injury or damage which said materials or equipment may sustain from any source or cause whatsoever before final acceptance.
- B. Cover and protect electrical equipment during construction from dust, dirt, debris, overspray, or other construction contaminants.

3.13 CLEANING AND REPAIR

- A. Throughout the work, the Contractor shall keep the work area reasonably neat and orderly by frequent periodic cleanups.
- B. Prior to substantial completion, clean equipment and systems used during construction.
- C. Repair surfaces damaged or impacted by the work. Restore to original condition or better. Retexture surfaces to match surrounding surfaces. Repaint affected surfaces, with extent of paint to include adjacent surfaces to next wall or other clean break to avoid mismatched finish.
- D. As independent parts of the installation are completed, they may be tested and utilized during

construction.

3.14 ACCESS DOORS

- A. Provide access doors required for access to equipment provided under Divisions 26, 27 and 28. Doors shall be rated for the surrounding construction. Use of access doors shall be minimized, and all locations and cosmetic features shall be submitted for approval in advance.
- B. Doors shall be finished to match surrounding surfaces as approved by the Contracting Agency.

3.15 DEMOLITION

- A. Examination Prior to Bid: Drawings involving existing conditions are based on building record drawings and/or limited field observation. Conduct a site inspection prior to submission of Bid to become thoroughly familiarized with the Scope of Work. Report discrepancies to Contracting Agency. Submission of bid certifies acceptance of existing conditions.
- B. Examination Prior to Start of Demolition: Conduct a thorough site inspection before disturbing existing installation. Verify field measurements and circuiting arrangements. Verify that abandoned wiring and equipment serve only abandoned facilities. Beginning of demolition certifies acceptance of existing conditions.
- C. Preparation:
 - 1. Disconnect electrical systems in walls, floors, ceilings, etc., scheduled for removal.
 - 2. Coordinate utility service outages with utility companies and Contracting Agency.
 - 3. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
 - 4. Existing Electrical Services: Maintain existing systems in service until new systems are complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner at least 24 72 hours before partially or completely disabling system. Contractor shall not be entitled to any additional compensation due to inability of Owner to grant an outage at the desired time. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
 - 5. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Owner and applicable Fire Department Authorities at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area. Provide fire watch for entire affected area for entire duration of outage. System outage shall not be considered terminated until the system has been tested and accepted in accordance with the testing requirements outlined in Section 28 31 00 - Addressable Fire Alarm System.
- D. Demolition of Existing Electrical Work:
 - 1. Remove, relocate, and extend existing installations to accommodate new construction.
 - 2. Remove abandoned wiring to source of supply.
 - 3. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut concealed conduit flush with walls and floors, and patch surfaces.
 - 4. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets, which are not removed. In finished areas, blank covers shall be blank plates matching the device plates specified for new work, unless otherwise noted or specified.
 - 5. Disconnect and remove abandoned panelboards and distribution equipment.
 - 6. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
 - 7. Disconnect and remove abandoned light fixtures. Remove brackets, stems, hangers, and

other accessories.

8. Repair adjacent construction and finishes damaged during demolition and extension work.
 9. Maintain access to existing electrical installations that remain active. Modify installation or provide access panels as appropriate.
 10. Restore circuits and systems to remain that are affected in any way by demolition Work, such as loads downstream of demolished equipment, switched lighting circuits where selected fixtures are demolished, etc.
 11. Salvage or disposal of removed items shall be as noted on the Drawings or as directed by the Contracting Agency. Items, which the Owner does not desire to retain, shall be disposed of at a legal disposal site.
- E. Cleaning and Repair:
1. Clean and repair existing materials and equipment that remain or are to be reused or are affected by this work.
 2. Panelboards: Clean exposed surfaces and interior of cabinet and retorque electrical connections. Provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
 3. Light Fixtures: Remove existing light fixtures for cleaning. Use mild detergent to clean exterior and interior surfaces; rinse with clean water and wipe dry.

END OF SECTION

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes specific requirements, products, and methods of execution relating to wire and cable, 600 volts or less, approved for use on this project.
- B. Related Sections
 - 1. 26 05 33 - Raceways and Boxes for Electrical Systems
 - 2. 26 05 53 - Identification for Electrical Systems

1.02 REFERENCES

- A. International Electrical Testing Association:
 - 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- B. National Fire Protection Association:
 - 1. NFPA 70 - National Electrical Code.
 - 2. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

1.03 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.04 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.05 SUBMITTALS

- A. Provide submittals for products in accordance with Section 26 00 00 - Electrical General Requirements and Division 1.

1.06 QUALITY ASSURANCE

- A. Conductors shall be sized according to American Wire Gauge (AWG). Stranding, insulation, rating and geometrical dimensions shall conform to UL and ICEA specifications.

PART 2 - PRODUCTS

2.01 INSULATION TYPES

- A. Branch circuit conductors shall be 600 volt insulated, and unless otherwise noted on the Drawings, shall have the following insulation types:
 - 1. Heated indoor spaces - THHN/THWN or XHHW.
 - 2. Outdoors, wet locations (such as slab-on-grade), or other cold locations (such as unheated attics) - XHHW.
- B. Feeder conductors shall be 600 volt insulated, and unless otherwise noted on the Drawings, shall have the following insulation types:
 - 1. Heated indoor spaces - THHN/THWN or XHHW-2.
 - 2. Outdoors, wet locations (such as slab-on-grade), or other cold locations (such as unheated attics) - XHHW-2.
- C. Nylon-jacketed conductors such as Types THHN or THWN shall not be used in any location subject to ambient temperatures below 20° F.
- D. Special applications: Conductors in fluorescent fixture wiring channels shall have 90° C insulation rating, Types THHN, XHHW, or equal. Conductors in high temperature locations shall have one of the special insulation types suitable for the use and as permitted by the NEC.

2.02 TYPE FPLP/MC CABLE

- A. In existing non-accessible spaces, where required to be fished, Type FPLP/MC metal clad fire alarm/control cable is acceptable on this project. Cable shall be UL Listed as Type FPLP Metal Clad/Power limited fire-protective signaling cable - FPLP (105°C) / MC (90°C). Submit for approval, prior to installation, all intended applications. Cable installed without prior approval is subject to removal at the Contractor's expense at the discretion of the Contracting Agency.
- B. Type FPLP/MC technical specifications:
 - 1. Armor: Galvanized steel (red striped).
 - 2. Conductors: Solid copper (number as required for application).
 - 3. Conductor insulation: TFN/THHN.
 - 4. Assembly covering: Polypropylene tape.
 - 5. Maximum temperature rating: FPLP 105°C (dry); MC 90°C (dry).
 - 6. Grounding: Bare grounding conductor.
 - 7. Maximum voltage rating: FPLP 300V; MC 600V.
 - 8. Minimum conductor size: 18 AWG.
- C. Fittings for use with Type FPLP/MC metal clad fire alarm/control cable shall be designed specifically for use with Type FPLP/MC and manufactured by the producer of the Type FPLP/MC cable.

2.03 MISCELLANEOUS

- A. Miscellaneous: Miscellaneous wire and cable for special purpose applications and not covered in the categories as indicated above or otherwise specified, shall be as shown on the plans and/or required by the intended use.

2.04 MINIMUM SIZE

- A. Unless specified otherwise minimum wire sizes shall be as follows:
 - 1. #12 AWG for branch circuit wiring.
 - 2. #20 AWG for low voltage switching circuits if part of an approved cable assembly, #18 AWG otherwise.
 - 3. #14 AWG for control circuit wiring.
 - 4. #16 AWG for light fixture whips, refer to specification section 26 05 33 - Raceway and Boxes for Electrical Systems, for maximum fixture whip lengths.

- B. On 20A circuits, with one-way conductor lengths measured from panel to farthest receptacle, or center of lighting string (as applicable):
 - 1. #10 AWG for 120V circuits of 75 feet to 120 feet.
 - 2. #8 AWG for 120V circuits of 120 feet to 200 feet.
 - 3. #10 AWG for 277V circuits of 130 feet to 215 feet.
 - 4. #8 AWG for 277V circuits of 215 feet to 330 feet.
- C. Similar oversizing shall apply to circuits of other ratings and/or greater lengths, as necessary to comply with the voltage drop limitations in Part 3 of this Section.
- D. Cable or conductors for fire alarm systems and other special systems shall be as described in other sections of the specifications, noted on the drawing, or recommended by the equipment manufacturer, whichever is greater.

2.05 CONDUCTORS

- A. Conductors used on this project shall be copper, solid or stranded for wiring #10 and smaller, stranded for #8 and larger.
- B. Stranded control, communication, and alarm conductors shall have compression terminations where terminated on screw terminals.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Unless otherwise noted or specified, all conductors shall be run in raceways as specified in Section 26 05 33 – Raceways and Boxes for Electrical Systems. Raceways shall be installed as a complete system, free from obstructions, and clean before conductors are installed.
- B. Provide conductors from outlet to outlet and splice branch circuit conductors only at outlet or junction boxes. Install all conductors in a single raceway at one time and leave sufficient cable at all fittings or boxes. Keep conductors within the manufacturer's allowable tension. Do not violate minimum bending radii. Lubricants for wire pulling, if used, shall conform to UL requirements for the insulation and raceway material.
- C. Do not install Type XHHW conductors in temperatures below -10° F, or the other types in temperatures below +20° F.
- D. Conductors that extend below grade shall be suitable for wet locations (type XHHW or XHHW-2). The use of THHN below grade is not acceptable.

3.02 CONDUCTOR SUPPORT

- A. Provide conductor supports as recommended by the NEC or cable manufacturer in vertical conduits.

3.03 SPLICING

- A. No splicing or joints are permitted in branch circuits except at outlet or accessible junction boxes. Prior to splicing, conductors shall be stripped to the exposed length recommended by the splicing device manufacturer.
- B. Utilize compression type solderless connectors when making splices or taps in conductors No. 8 AWG or larger. Provide heat or cold shrink type insulating tubing on splices and tape outer surface continuously with Scotch #88 plastic tape to secure insulation strength equal to that of the conductors joined.
- C. Utilize pre-insulated connectors, hard-shell type only, Ideal Industries, Inc., "Wing-Nut" or "Twister Pro" or "In-Sure Push-in Connectors" for splices and taps in conductors No. 10 AWG and smaller in dry locations.

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

Division 26
Section 26 05 19

- D. Utilize Ideal "Twister DB Plus", water repellent, sealant filled, UL 486D Listed connector splices and taps in conductors No. 10 AWG and smaller in damp or wet locations.
- E. Utilize "Buchanan pre-insulated crimp connectors" on stranded conductors for fire alarm control and alarm circuits.
- F. Splices in underground junction boxes, handholes, and manholes are not permitted.
- G. Feeder conductors shall be installed with no splices unless otherwise noted on the Drawings. Splices in feeder conductors, where specifically allowed, shall be compression type butt splices.

3.04 CONDUCTOR TERMINATION

- A. Provide power and control conductors that terminate on equipment or terminal strips with solderless lugs or T & B "Sta-Kon" terminals.
- B. Prior to termination, conductors shall be stripped to the exposed length recommended by the termination device manufacturer.

3.05 CONDUCTOR PHASE COLOR CODING

- A. Service, feeder and branch circuit conductors throughout the project secondary electrical system shall be color coded as follows:

208/120 Volts	Phase	480/277 Volts
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray (see following)
Green	Ground	Green

Permanently post conductor color code at each panelboard in accordance with NEC Article 210 and Section 26 05 53 – Identification for Electrical Systems

- B. Where color coded conductors are not commercially available, colored non-aging, plastic tape may be utilized where permitted by NEC.
- C. Where neutrals of different systems exist on the project, neutral conductor identification method shall satisfy the Authority Having Jurisdiction, as to compliance with NEC Article 200. Branch circuit neutral conductors shall have a color stripe matching the corresponding phase conductor where neutral is not shared.
- D. Phases in panelboards and similar equipment shall be connected Phase A, B, C from left to right, top to bottom, or front to back.

3.06 DERATING OF CONDUCTORS

- A. Derating of conductors shall be per National Electrical Code.

3.07 VOLTAGE DROP

- A. The maximum total voltage drop shall not exceed three (3) percent in branch circuits or feeders, for a total of five (5) percent to the farthest outlet based on steady state design load conditions. Wire sizes shown on the Drawings are for minimum ampacity. Wire and conduit sizes shall be increased to limit voltage drop based upon actual lengths required in the field. Base voltage- drop calculations on NEC Chapter 9, Table 9.
- B. Secondary transformer voltage taps may be used to offset voltage drop as long as no load

voltage does not exceed 125 volts at transformer secondary.

3.08 OPEN WIRING ABOVE LAY-IN CEILINGS PROHIBITED

- A. Wiring for all systems shall be installed in one of the raceway systems. Refer to the Drawings and the specific Section under which each system is specified.
- B. Wiring installed in cable trays in air-handling ceiling spaces shall be approved for the application and the specific system.
- C. Raceways and sleeves shall be sized in accordance with the cabling requirements for the special system involved.

3.09 TESTING

- A. Feeder and branch circuit cables larger than #4 AWG shall be megger tested prior to final termination in accordance with Section 26 00 00 - Electrical General Requirements.

END OF SECTION

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes general requirements, products and methods of execution relating to the furnishing and installation of a complete grounding system as required for this project.

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. The publications listed below form a part of this specification. The publications are referred to in the text by basic designation only, latest edition.

NUMBER	TITLE
ANSI/IEEE C2	National Electrical Safety Code
ANSI/NFPA 70	National Electrical Code
ANSI/TIA/EIA 606-A	Administration Standard for Commercial Telecommunications Infrastructure
ANSI/TIA/EIA-607	Commercial Building Grounding and Bonding Requirements for Telecommunications
IEEE C62.41	Recommended Practice on Surge Voltages in Low-Voltage Surge Protective Devices
IEEE C62.42	Guide for the Application of Gas Tube Arrester Low-Voltage Surge Protective Devices
IEEE Draft P1250 (D4)	Guide on Service to Equipment Sensitive to Momentary Voltage Disturbances

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

Division 26
Section 26 05 26

NUMBER	TITLE
IEEE Std 1100	Recommended Practice for Powering and Grounding Sensitive Electronic Equipment
IEEE Std 142	Recommended Practice for Grounding of Industrial and Commercial Power Systems
IEEE STD 81	Recommended Guide for Measuring Ground Resistance and Potential Gradients in the Earth
NFPA 70	National Electric Code (NEC) - Codebook and Handbook
REA PE-33	(1985) Shield Bonding Connectors
UL 1449 Edition 3	Surge Protective Devices (SPDs)
UL 467 Edition 6	Grounding and Bonding Equipment
UL 497 Edition 5	Protectors for Paired Conductors for Communication Circuits
UL 497A Edition 1	Secondary Protectors for Communication Circuits
UL 497B Edition 1	Protectors for Data Communication and Fire Alarm Circuits

1.05 SUBMITTALS

- A. Provide submittals for products in accordance with Section 26 00 00 - Electrical General Requirements and Division 1. Include copies of catalog cuts, data sheets and other descriptive information for all specified materials.

1.06 MINIMUM REQUIREMENTS

- A. The minimum requirements for the system shall conform to Article 250 of the NEC.

1.07 SPECIAL REQUIREMENTS

- A. Unless specified elsewhere, the ohmic values for grounds and grounding systems shall be as follows:
 1. For grounding metal enclosures and frames for electrical and electronically operated equipment -- 5 ohms maximum.
 2. For grounding systems to which electrical utilization equipment and appliances are connected -- 5 ohms maximum.
 3. For grounding secondary distribution systems, neutrals, noncurrent carrying metal parts associated with distribution systems, and enclosures of electrical equipment not normally within reach of other than authorized and qualified electrical operating and maintenance personnel -- 10 ohms maximum.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Grounding conductors, ground rods, and equipment required for ground systems shall be listed for the purpose intended and approved by a Nationally Recognized Testing Laboratory (NRTL) and be in accordance with U.L. 467.

2.02 CONNECTIONS

- A. Joints in grounding conductors below grade shall be made with exothermic welding process or hydraulically crimped fittings listed for direct burial. Terminations above grade shall be made with solderless lugs, securely bolted in place.
- B. Clamps, lugs, connectors, bonding bushings, and other such grounding and bonding items shall be:
 - 1. Labeled or listed for the purpose.
 - 2. Shall be made (both body and hardware) of hot dip galvanized steel, bronze, or other corrosion resistant alloy (except bushing throats shall be plastic).
 - 3. Shall be the products of O-Z/Gedney, T & B, Raco, or accepted equals.
 - 4. In outdoor, damp, or corrosive environments, metals for these items shall be copper (with or without tinplating), bronze, or other corrosion resistant alloys only; O-Z/Gedney or accepted equal.

2.03 IDENTIFICATION AND LABELING

- A. Grounding conductors shall be identified in accordance with the NEC.

PART 3 - EXECUTION

3.01 EQUIPMENT GROUND

- A. The raceway system shall be bonded in conformity with NEC requirements to provide a continuous ground path. Where required by Code or Ordinance or where called for on the plans an additional grounding conductor shall be provided, sized in conformity with Table 250.122 of the NEC, unless larger size is noted.
- B. Provide separate grounding conductor securely bonded and effectively grounded to the enclosures at both ends of all non-metallic raceways and all flexible conduit.
- C. Provide an equipment grounding conductor sized in conformity with Table 250.122 of the NEC, unless larger size noted, for all new feeder and branch circuit conduits. Where conductors are adjusted in size to compensate for voltage drop, equipment grounding conductors shall be adjusted proportionately according to circular mil area.
- D. Refeeding existing feeder/branch circuits that do not have an existing equipment grounding conductor: Bond equipment grounding conductor of new feeder or branch circuit to junction box and new and existing conduits.

3.02 CORDS AND NONMETALLIC CABLES

- A. Unless specifically permitted otherwise, cords and nonmetallic cables shall be furnished with integral Code-sized grounding conductor. Securely bond metal components and effectively ground the entire electrical system.

3.03 EXTERNAL BONDING JUMPERS

- A. Not permitted; bonding jumpers shall be run inside the raceways for the circuits they serve.

END OF SECTION

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes:
 - 1. General hanger and support requirements for electrical equipment, conduit and cable trays not required to be vibration and/or seismically controlled.
 - 2. Penetrations, sleeves and seals.
- B. Related Sections:
 - 1. 26 00 00 - Electrical General Requirements
 - 2. 26 05 33 - Raceways and Boxes for Electrical Systems
 - 3. 26 50 00 - Lighting Fixtures

1.02 REFERENCES

- A. NFPA 70: National Electrical Code (NEC) latest legally enacted edition.

1.03 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.04 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.05 DESCRIPTION

- A. Provide general hanger and support requirements for electrical equipment, conduit and cable trays not required to be vibration and/or seismically controlled in accordance with the manufacturer's written installation instructions and NFPA 70.

1.06 SUBMITTALS

- A. See Section 26 00 00 - General Electrical Requirements for general submittal requirements.
- B. Product Data:
 - 1. Provide manufacturers catalog data for each product specified. Indicate channel gauge and maximum load capacities of the selected products.
 - 2. Manufacturer's Installation Instructions: Include assembly instructions, recommended parts and special procedures as required.
- C. Shop Drawings:
 - 1. Provide a single shop drawing submittal which integrates the shop drawing requirements

of this section.

2. Provide shop drawings to include the following:
 - a. Housekeeping pads (coordinated with approved electrical equipment footprints and anchor point locations).
 - b. Pre-engineered and field fabricated support system details for each installation location. To include but not limited to:
 - 1). Lighting Fixture support.
 - 2). Conduit, raceway and control panel support.
 - 3). Trapeze hangers.
 - 4). Electrical equipment support.
 - c. Equipment locations and conduit and cable tray routing coordinated with mechanical equipment and systems. Indicate routing height above finished floor.
 - d. Indicate hanger type/attachment method and hanger spacing intervals.
- D. Project Record Information:
 1. Indicate installed locations of hangers and supports on project as-built shop drawings.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site:
 1. Verify products are delivered in original factory packaging and are free from damage and corrosion.
 2. Replace equipment delivered to job site that does not comply with above requirements at no expense to the Owner.
- B. Storage and Protection:
 1. Store products in covered storage area, protected from the elements, outside the general construction area until installed.
 2. Handle items to avoid damage.
 3. Replace damaged items with same item in new condition.

1.08 WARRANTY

- A. Provide warranty in accordance with Section 26 00 00 - General Electrical Requirements.

PART 2 - PRODUCTS

2.01 PRE-ENGINEERED SUPPORT SYSTEMS

- A. Manufacturers:
 1. Unistrut
 2. Super-Strut
 3. B-Line
 4. K-Line
 5. Erico.
- B. Material:
 1. Cold worked steel.
 2. Type 304 stainless steel: Use for PVC, liquid-tight flex, or plastic-coated conduit installed on wood construction in outdoor, damp, corrosive or marine environments.
- C. Finish:
 1. Heated indoor areas: Pre-galvanized zinc coating.
 2. Outdoor areas: Hot dipped galvanized finish. In addition, coat hot dipped galvanized finish channel field cuts with zinc rich paint provided by the support system manufacturer.
 3. Painted areas: Paintable galvanizing or phosphatized and primed.
 4. Surface metal raceways: U.L. Listed epoxy coating.

- D. Channel:
 - 1. Standard Size: 1-5/8 inch x 1-5/8 inch. Gauge thickness as required for attached load.
 - 2. Standard Hole Pattern: Slotted. Provide solid channel in exposed public areas.
- E. Nuts and Hardware:
 - 1. Channel nuts: Hardened steel (ASTM-A675 and ASTM A36).
 - 2. Bolts, screws and nuts: Hardened steel (ASTM-A307, ASTM A563 and SAE J429).
 - 3. Finish: Electroplated zinc.
- F. Fittings: Plate steel (ASTM A635). Epoxy or electroplated zinc coating.
- G. Electrical Accessories: Provide accessories from the support system manufacturer designed for the specific equipment to be supported to include but not limited to:
 - 1. Fluorescent fixture hangers.
 - 2. Outlet box adapters.
 - 3. Snap-in closures.
 - 4. Conduit connection plates.
 - 5. Junction box adapters.
 - 6. Strut joiners.
 - 7. "Caddy" fasteners are permitted for support of conduit to concealed metal studs and for conduit concealed above suspended acoustical ceilings.

2.02 SLEEVES, ACOUSTICAL SEALS AND FIRE-STOPPING

- A. See Part 3 - PENETRATIONS.
- B. Sleeves for pipes through fire rated and fire resistive floors and walls, and fireproofing: UL listed prefabricated fire rated sleeves and seals.

2.03 WALL/FLOOR PENETRATION WATER SEALS

- A. Mechanical seal consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the conduit and the wall opening.
- B. EPDM seals.
- C. 316 Stainless steel bolts and nuts.
- D. Hot-dipped galvanized or coated sleeve with full water stop flange with continuous weld on both sides.
- E. Manufacturer: Metraflex, Thunderline, Crouse-Hinds, or pre-approved equal.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Prior to installation, prepare detailed shop drawings of the planned installation of hanger and support products specified by this section. Coordinate the location, type and size of hangers and supports, housekeeping pads (thickness/perimeter overhang dimensions) and roof curbs with Architectural and Structural elements utilizing the shop drawing review process.
- B. Do not install hangers and supports without approved shop drawings.

3.02 GENERAL INSTALLATION

- A. Install hangers and supports in accordance with manufacturer's instructions, applicable Code requirements (NFPA 70) and approved shop drawings.
- B. See Section 26 00 00 – Electrical General Requirements for electrical equipment wall mounting heights.

3.03 VIBRATION AND SEISMIC CONTROL PRODUCT INSTALLATION

- A. Install vibration isolators, seismic control and wind restraint systems in strict compliance with the manufacturer's written instructions and certified and approved application engineering installation drawings and details.

3.04 INSERT AND ATTACHMENT INSTALLATION

- A. Inserts
 1. Provide inserts or cast-in-place channels for placement in concrete formwork.
 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
 3. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
 4. Use expansion type anchor bolts with pre-cast concrete including concrete masonry units within loading limits of the pre-cast material and anchor bolt manufacturer's recommendations.
 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.
 6. Plastic screw inserts and caulked lead inserts are prohibited, except for mounting instructions and control diagrams.
- B. Attach electrical equipment to structure as follows:
 1. Hollow masonry: Toggle bolts.
 2. Solid masonry and concrete: Preset inserts or expansion bolts.
 3. Structural steel: Beam clamps which engage both sides of structural member or have retaining clips or other approved means for positive engagement.
 4. Metal surfaces: Machine screws, bolts or welding.
 5. Wood construction: Wood or sheet metal screws. Bugle head drywall screws or deck screws are not allowed.
 6. Do not use powder actuated fasteners for anchorage in tension applications. Obtain written permission from the Owner prior to using any type of powder powered studs.
 7. Attachment to plaster or gypsum board (sheet rock) not approved. Equipment shall be attached to or supported from structure.

3.05 RACEWAY INSTALLATION

- A. Support raceways using approved types of wall brackets, ceiling trapeze hangers or malleable iron straps utilizing attachment methods described above. "Perforated plumber's strap" is not permitted as a means of support.
- B. Support raceways independent of ceiling systems, piping and ductwork. Exceptions: Lighting fixtures and outlet boxes (i.e. ceiling speaker boxes) specifically designed for attachment to suspended ceiling systems
- C. Support EMT conduit (1-1/2 inch and smaller/dry locations) using hanger rods with spring steel fasteners.
- D. Support cable trays and multi-conduit runs independently from other support systems utilizing double hanger rods at each support point.

3.06 LIGHTING INSTALLATION

- A. General
 1. Attach safety hanger wires to lighting fixtures such that in event of a ceiling suspension system failure, no part of the fixture will drop more than 6 inches below normal ceiling height. Secure each end of each wire with a minimum of three tight wraps.
- B. Fixtures (greater than 20 pounds/non-suspended ceiling applications)
 1. Support lighting fixtures from structural members capable of supporting the total weight of the fixture and independent from electrical wiring system. Attach to steel members

using approved beam clamps and rods.

- C. Fixtures (suspended ceiling system applications)
 - 1. Positively attach lighting fixtures to suspended ceiling grid for 100 percent of fixture weight acting in any direction using positive clamping devices that fully surround the supporting member (i.e. Caddy "IDS" or equal).
 - 2. Provide supplemental safety hanger wires as follows:
 - a. Fixtures (weighting less than 56 pounds): Provide two 12 gauge wires or equivalent chains connected from the diagonal corners of the light fixture housing to the structure above. These wires may be slack.
 - b. Fixtures (weighting greater than 56 pounds): Provide full direct support from the structure above. Attach wires from within 3 inches of each corner of the fixture.
 - c. Pendant-hung lighting fixtures
 - 1). For each fixture, provide direct support from the structure above using a minimum of two 12 gauge wires, equivalent aircraft cable or an approved alternate support system without using the ceiling suspension system for direct support. Securely attach wire/cable to fixture, route through fixture stem and securely attached to structure.
 - 2). Provide loop and hook or swivel hanger assemblies fitted with a restraining device to secure stem in the support position during earthquake motion.
 - 3). Support fluorescent fixtures with flexible hanger device at the attachment point to the fixture channel to preclude breaking of the support. The motion of swivels or hinged joints shall not cause sharp bends in conductors or damage to insulation.

3.07 PENETRATIONS

- A. Coordinate electrical penetrations with architectural, structural and mechanical construction details prior to installation. Set sleeves in position in concrete formwork. Provide reinforcement around sleeves as required.
- B. Provide compatible materials, fasteners, adhesives, sealants, and other products required for proper installation.
- C. Penetrations through roof, exterior walls and floors shall be weather and water tight (see floor penetration seals).
- D. Firestopping: Provide UL rated firestopping assemblies for rated roof, wall and floor penetrations in accordance with Division 7.
- E. Conduit Sleeves
 - 1. Provide sleeves for conduit passing through floors, walls, ceilings, or roofs.
 - a. Fabricate sleeves in non-load bearing walls from 20 gauge galvanized sheet steel conforming to ASTM A 924/A 924M.
 - b. Fabricate sleeves in load bearing walls from standard weight galvanized steel pipe conforming to ASTM A 53/A 53M.
 - c. Provide 1/2 inch clearance between conduit and sleeve opening.
 - 2. Provide escutcheons for conduit passing through walls, floors and ceilings in finished areas, below counters and inside closets and casework subject to view when doors are open. Size escutcheons to cover sleeves. Secure escutcheons in position.
- F. Acoustical Seals
 - 1. Monolithic sound walls (i.e. poured concrete or masonry): Provide wall sleeve with approximately one-inch annular space around conduit. Pack annular space with backer rod or acoustical filler as specified in Division 7. Allow a 1 inch recess at each end of sleeve. Caulk sleeve flush with flexible sealant or fire-stopping material as specified in Division 7.
 - 2. Where acoustical wall is a two-component type, such as a staggered or double stud partition, treat each component as a separate wall. Pack and seal each half of

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

Division 26
Section 26 05 29

penetration sleeve as previously specified, except that only the exposed end of each sleeve portion shall be caulked with sealant or firestop. Provide adequate separation between each sleeve.

G. Wall Penetration Seals

1. Provide pre-engineered wall penetration water seal systems for exterior wall penetrations.
2. Select appropriate wall penetration sealing systems based on conduit material and nominal conduit size in accordance with the manufacturer's selection charts.
3. Install conduit and sealing system prior to waterproofing the wall. Grout void between water seal and outside face of foundation wall to provide continuous bearing surface for waterproofing fabric.

H. Floor Penetration Seals

1. Provide pre-engineered floor penetration water seal systems for conduit floor penetrations in rooms where a pipe leak/failure could result in water damage to adjacent spaces (i.e. mechanical rooms located above the ground floor or basement) and other areas as noted.
2. Extend conduit floor penetration sleeves 2 inches above finished floor.

END OF SECTION

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes specific requirements, products, and methods of execution relating to conduit, conduit fittings, surface raceways, multi-outlet assemblies, wireways, outlet boxes, pull boxes and junction boxes approved for use on this project. Type, size and installation methods shall be as shown on Drawings, required by Code and/or specified in this Section.
- B. Related Sections
 - 1. 26 05 19 - Low Voltage Electrical Power Conductors and Cables
 - 2. 26 05 26 - Grounding and Bonding for Electrical Systems
 - 3. 26 05 29 - Hangers and Supports for Electrical Systems

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 REFERENCES

- A. American National Standards Institute/Underwriters Laboratory
 - 1. ANSI C80.1 – Electrical Rigid Steel Conduit
 - 2. ANSI C80.3 – Steel Electrical Metallic Tubing
 - 3. ANSI C80.5 – Electrical Rigid Aluminum Conduit
 - 4. ANSI C80.6 – Electrical Intermediate Metal Conduit
 - 5. ANSI/UL 1 – Flexible Metal Conduit
 - 6. ANSI/UL 6 – Electrical Rigid Metal Conduit – Steel
 - 7. UL 6A – Standard for Electrical Rigid Metal Conduit – Aluminum and Stainless Steel
 - 8. UL 360 – Standard for Liquid Tight Flexible Steel Conduit
 - 9. UL 514A – Metallic Outlet Boxes
 - 10. UL 514B – Conduit, Tubing and Cable Fittings
 - 11. UL 651 – Standard for Schedule 40 and 80 Rigid PVC Conduit and Fittings
 - 12. UL 651A – Type EB and A Rigid PVC Conduit and HDPE Conduit
 - 13. ANSI/UL 651B – Standard for Continuous Length HDPE Conduit
 - 14. ANSI/UL 797 – Electrical Metallic Tubing – Steel
 - 15. ANSI/UL 1242 – Electrical Metal Intermediate Conduit – Steel

- B. National Electrical Manufacturers Association
 - 1. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum)
 - 2. NEMA FB 1 – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing and Cable
 - 3. NEMA OS 1 – Sheet Steel Outlet Boxes, Device Boxes, Covers and Box Supports
 - 4. NEMA RN 1 – Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
 - 5. NEMA TC 2 – Electrical Polyvinyl Chloride (PVC) Conduit
 - 6. NEMA TC 3 – Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing
 - 7. NEMA WD 6 - Wiring Device Configurations.
- C. NECA (National Electrical Contractors Association) Standard of Installation.

1.05 SUBMITTALS

- A. Provide submittals for all products in accordance with Section 26 00 00 - Electrical General Requirements and Division 1.
- B. Product Data: Provide dimensions, knockout sizes and locations, materials, fabrication details, surface raceway finishes (custom factory pre-painting, color as selected by architect), and accessories.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.06 QUALITY ASSURANCE

- A. Raceways and boxes shall be standard types and sizes as manufactured by a nationally recognized manufacturer of this type of materials and be in conformity with applicable standards and UL listings.
- B. Surface raceways shall be of the latest approved design as manufactured by a nationally recognized manufacturer and shall be listed by the Underwriters' Laboratory and bear the UL label.
- C. Pull and junction boxes 50 cubic inches and smaller shall conform to specifications for outlet boxes.
- D. Pull and junction boxes larger than 50 cubic inches shall conform to U.L. Standard 50, Cabinets and Boxes.
- E. Perform Work in accordance with NECA Standard of Installation.
- F. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 - PRODUCTS

2.01 CONDUIT

- A. Conduit types specifically approved for use on this project shall be of the following types only:
 - 1. Galvanized rigid metal conduit - GRC or RMC.
 - 2. Intermediate metal conduit - IMC.
 - 3. Rigid copper-free aluminum conduit.
 - 4. Electrical metallic tubing - EMT.
 - 5. PolyVinyl Chloride conduit - PVC: Schedule 40 or Schedule 80 is permitted ONLY where specifically noted or specified.
 - 6. Flexible metal (steel) conduit - FMC or flex: In short lengths as specifically permitted.

7. Liquid-tight flexible steel conduit - LFMC: In short lengths as specifically permitted.
8. Extreme temperature liquid-tight flexible steel conduit - AT: Shall have temperature rating of -67 ° F to +220 ° F, Liguatite "ATLA", or as approved.

2.02 FIRE ALARM CONDUIT

- A. In unfinished, non-public areas such as mechanical, electrical and utility rooms, Or unoccupied areas; EMT conduit utilized for fire alarm system wiring shall be factory pre-painted with a bright red topcoat, Allied Fire Alarm Red or as approved. Other conduit types utilized for fire alarm system wiring shall be identified with red paint or red tape wrapped a minimum of 4 times around the conduit every 10 feet and at each fire alarm system junction box.

In finished and public areas EMT and other types of conduit utilized for fire alarm system wiring shall be identified with tags with red lettering indicating "Fire Alarm" conduit every 10 feet and at each fire alarm system junction box.

2.03 CONDUIT FITTINGS

- A. Fittings utilized with rigid steel, IMC, and aluminum shall be galvanized steel or iron or copper-free aluminum and shall be threaded. Conduit bushings shall be provided and shall be of the insulated types. Where grounding bushings are required, provide insulated grounding bushings with integral pressure type ground lugs, Thomas & Betts "Blackjack", or as approved.
- B. Couplings and connectors for EMT shall be made of steel or malleable iron. Die-cast products shall not be used. Connectors shall have insulated throats. Connectors and couplings shall be compression type.
- C. Fittings for flexible metal conduit shall be steel or malleable iron only. All throats shall be insulated.
- D. Fittings for liquid-tight flexible conduit shall be steel or malleable iron, of a type incorporating a threaded grounding cone, nylon or plastic compression ring, and a tightening gland, providing a low resistance ground connection. All throats shall be insulated.

2.04 SURFACE METAL RACEWAY

- A. The Basis of Design is equipment from Wiremold, Hubbell or Mono-Systems, to set a standard for quality and style.
- B. Large multi-circuit raceways shall be sheet metal channel 4 3/4 inches wide, 1-3/4 **inches deep** with metal divider to separate power and communications wiring compartments and fitted cover, suitable for use as surface metal raceway, Wiremold Series 4000, or as approved.
- C. Small surface metal raceway for individual circuit runs shall be one piece surface metal raceway of the appropriate dimensions for the conductors, Wiremold Series 500/700, or as approved.
- D. Finish: Large raceways shall be factory pre-painted a custom color as selected by the Architect. Small raceways shall be furnished with factory ivory color finish and field painted to match adjacent surfaces, unless otherwise noted on the Drawings.
- E. Large raceways shall have factory pre-punched base channel mounting fastener holes. Provide suitable backing for mounting attachment, hollow wall anchors shall not be used.
- F. Provide manufacturer's standard Fittings, Boxes, and Extension Rings:
 1. Wall box connectors shall be concealed entry type.
- G. Uses Permitted
 1. Surface metal raceway shall only be used where specifically shown on the Drawings or where conditions warrant its use and Approved by the Owner, e.g., where it is required to connect to devices mounted on hard surfaces such as concrete in public areas.

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

Division 26
Section 26 05 33

Concealed conduit shall be used in all other locations, e.g., behind sheet rock walls, above sheet rock ceilings, above linear metal ceilings, above acoustical tile ceilings, etc. Exposed conduit shall be used for devices mounted on steel structure or concrete in non-public areas such as mechanical and electrical rooms, etc. Concealed conduit shall be used in all other locations.

2.05 MULTI-OUTLET ASSEMBLY

- A. Divided multi-outlet assemblies shall be sheet metal channel 4 3/4 inches wide, 1 3/4 inches deep with metal divider to separate power and communications wiring compartments and fitted cover, suitable for use as surface metal raceway, Wiremold Series 4000, or as approved. Mounting fastener holes shall be factory pre-punched.
- B. Single channel multi-outlet assemblies shall be sheet metal channel 2 3/4 inches wide, 1 17/32 inches deep with fitted cover, suitable for use as surface metal raceway, Wiremold Series 3000, or as approved. Mounting fastener holes shall be factory pre-punched.
- C. Device fittings shall be suitable to accept a single or duplex standard electrical outlet or multi-telecommunication jack as specified in other Sections, Wiremold 4047, or as approved.
- D. Entrance fittings shall accept concealed conductor entry from the back via a flush outlet box in the wall. Entrance fitting cross section shall be identical to the sheet metal channel and shall accept the same fitted cover. Entrance fitting openings shall be factory pre-punched.
- E. Finish: Multi-outlet assemblies shall be factory pre-painted a standard color as selected by the Architect.
- F. Base channel mounting fastener holes shall be factory pre-punched in raceways. Provide suitable backing for mounting attachment, hollow wall anchors are not allowed.
- G. Fittings: Furnish manufacturer's standard couplings, elbows, outlet and device boxes, and connectors.

2.06 WIREWAY

- A. Unless otherwise noted on the Drawings, surface wireway in exposed or concealed locations shall be sheet metal channel suitable for use as a wiring trough, with hinged or screw cover, sized in accordance with the NFPA 70. Wireway shall be Square D Class 5100, 5120, 5140, as appropriate for the environment, or as approved.
- B. Wireway shall be of the NEMA Type (general purpose, oil-tight, dust-tight, rain-tight, etc.) appropriate for the environment where installed.
- C. Wireway shall be furnished without factory pre-punched concentric or eccentric conduit knockouts. Knockouts shall be field punched as required for the conduits installed.
- D. Finish shall be ANSI-49 gray epoxy paint finish applied by cathodic electrodeposition over a corrosion resistant phosphate preparation.

2.07 CAST BOXES

- A. Cast boxes with threaded hubs, external mounting brackets or holes, and gasketed covers shall be used in the following locations:
 - 1. Exterior locations.
 - 2. Wet or damp locations.
 - 3. Utility, mechanical, electrical rooms, Etc., where exposed to mechanical damage.
 - 4. Floor boxes installed in concrete.
 - 5. Exposed interior locations below 48 inch above floor where subject to damage.
 - 6. Where shown on Drawings.

2.08 STEEL BOXES

- A. Galvanized pressed steel boxes may be used wherever they are permitted by code, except in

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

Division 26
Section 26 05 33

areas indicated in the preceding paragraph.

- B. Flush mounted, pressed steel boxes shall be equipped with external mounting brackets for attachment to framing members with screws or nails.
- C. Ceiling boxes and wall boxes for bracket lights shall be not less than 4 inch in diameter by 1 ¼ inch deep and shall have 3/8 inch malleable iron fixture studs if required.
- D. Grounding Screw: All stamped steel boxes shall have a drilled and tapped hole in the back of the box for a grounding screw.
- E. Accessories: Box covers, extension rings, bases, hanger bars, etc., for use in connection with the installation, shall be approved for use in the various applications.

2.09 TELECOMMUNICATION OUTLET BOXES

- A. Boxes for telecommunication outlets shall be a minimum of 4 inches square by 2 1/8 inches deep.
- B. Device rings for telecommunication outlets shall be double-gang, minimum 5/8 inches deep, to provide a minimum internal finished depth of 2 3/4 inches.

2.10 INDOOR PULL AND JUNCTION BOXES

- A. Indoor pull and junction boxes shall conform to Article 314 of the NEC and the following requirements:
 - 1. Sheet metal boxes are approved for use in all dry, interior, nonhazardous locations.
 - 2. Boxes installed in wet locations shall be NEMA 3R, unless otherwise noted.
 - 3. Furnish such boxes, whether shown or not, in order to conform to requirements for maximum pulling length and maximum number of bends allowed.
 - 4. Special boxes, as noted on the Drawings, shall be installed in areas of specific service and/or hazards.
- B. Junction box extension rings will not be accepted on new boxes. Appropriate size boxes shall be used for each application.

2.11 TELECOMMUNICATION SYSTEM PULL BOXES

- A. Telecommunication system Pull Boxes shall also conform to ANSI/EIA/TIA 569-A and the BICSI Telecommunications Distribution Methods (TDM) Manual.
- B. Dimensions:
 - 1. Pull boxes for straight through pulls shall have minimum interior dimensions in accordance with the following Table:

Maximum Trade Size Conduit	Size of Box			For Each Additional Conduit Increase Width
	Width (inches)	Length (inches)	Depth (inches)	
1 Inch	4	16	3	2 inches
1 1/4 Inch	6	20	3	3 inches
1 1/2 Inch	8	27	4	4 inches
2 Inch	8	36	4	5 inches
2 1/2 Inch	10	42	5	6 inches
3 Inch	12	48	5	6 inches
3 1/2 Inch	12	54	6	6 inches
4 Inch	15	60	8	8 inches

2.12 TELECOMMUNICATION SYSTEM JUNCTION BOXES

- A. Unless otherwise specified or noted on the Drawings, splice boxes shall not be used in interior horizontal pathway conduits or interior backbone pathway conduits.
- B. Where required in a building service entrance or campus backbone pathway system, splice boxes shall be provided in accordance with the requirements of ANSI/EIA/TIA-569-A – Commercial Building Standard for Telecommunications Pathways and Spaces and the Building Industry Consulting Service International (BICSI) Telecommunications Distribution Methods Manual.

2.13 UNDERGROUND PULL AND JUNCTION BOXES

- A. Boxes set in ground shall be either precast concrete or cast iron. Covers shall be galvanized steel or cast iron, and shall be bonded to the grounding system with a stranded grounding conductor secured with a grounding lug. Provide sufficient slack to allow removal of the cover and normal working access.
- B. Underground concrete pull boxes installed in traffic areas shall be constructed to withstand AASHTO HS-20 wheel loading.

2.14 OUTDOOR ABOVE-GROUND PULL AND JUNCTION BOXES

- A. Boxes exposed to rain or installed in wet locations shall be NEMA 3R unless otherwise noted.
- B. Outdoor pull and junction boxes and conduit bodies for use with galvanized conduits shall be made of galvanized ferrous metal or cast aluminum, with integral threaded hubs or Myers-type weathertight hubs of matching composition and finish.
- C. Outdoor pull and junction boxes for use with PVC or plastic-coated conduits shall be made of fiberglass, with matching gasketed covers secured with captive monel or stainless-steel screws; Hoffman A-JFG series or accepted equal. Each metallic conduit entry (including liquidtight flex) shall be provided with a bronze bond bushing and NEC-sized copper bonding jumper inside the enclosure.
- D. Furnish such boxes, whether shown or not, in order to conform to requirements for maximum pulling length and maximum number of bends allowed.

PART 3 - EXECUTION**3.01 CONDUIT USES PERMITTED**

- A. Conduits shall be of the sizes shown on the Drawings or as required by the NEC, whichever is larger. Base sizes on using type XHHW for wire sizes #6 and smaller and type THHN/THWN wire for wire sizes #4 and larger. Unless otherwise noted, conduits installed in the following locations shall be of the types specifically identified only:
 - 1. Underground or encased in concrete - rigid steel, PVC-80 or IMC.
 - 2. Outdoors aboveground or damp locations - RMC, rigid aluminum, IMC or extreme temperature liquid-tight flexible steel conduit (where required).
 - 3. Dry indoor locations, concealed or exposed - RMC, rigid aluminum, EMT (where not susceptible to physical damage), flexible conduit where necessary, or IMC.
 - 4. Indoor locations, exposed, where susceptible to physical damage - RMC or IMC.
 - 5. Motor and equipment flexible connections - LFMC or FMC (when installed in plenum spaces).

3.02 RACEWAY INSTALLATION METHODS - GENERAL

- A. Concealed raceways: In occupied areas, conduit and raceways shall be concealed unless specifically noted otherwise. In service spaces (mechanical equipment rooms, electrical rooms, storage closets, etc.), approved raceways may be surface-mounted for connection to

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

Division 26
Section 26 05 33

equipment in exposed surface mounted locations and in exterior locations as noted on the Drawings.

- B. Concealed raceways shall be routed as directly as possible with a minimum of bends. Concealed raceways above lay-in ceilings shall be installed a minimum of 12 inches above the ceiling grid.
- C. Exposed Raceways: Where allowed by this Specification or specifically noted on the Drawings, raceways may be mounted on the surface of walls, ceilings and other surfaces. Exposed raceways shall comply with the following:
 - 1. Exposed raceways shall be run parallel or perpendicular to building lines and bent symmetrically or made up with standard elbows or fittings.
 - 2. Surface-mounted conduit, junction boxes, pull boxes, outlet boxes, etc. installed in finished areas shall be painted to match the surrounding surfaces.
 - 3. Connectors and fittings for raceways and conduits installed on the surface in exterior locations shall be suitable for and Listed for use in a wet location.
 - 4. Conduits installed in exterior locations shall be painted to match the exterior finish of the building surface to which they are attached. This shall include conduits attached via racks and stand-off brackets, or attached directly to the surface.
- D. There shall not be more than the equivalent of four quarter bends (360 degrees total) between pull points. Pull boxes added to conduit runs as a result of this requirement shall be in accordance with this Section.
- E. Conduit and tubing shall be cut square and reamed smooth at the ends and all joints made tight. Conduit threads shall be lubricated with an approved thread lubricant.
- F. Raceway for power wiring shall not be installed in the floor slab beneath telecommunication rooms.
- G. Each conduit shall enter and be securely connected to a cabinet, junction box, pull box or outlet box by means of a locknut on the outside and a locknut/bushing on the inside, or by means of a liquid-tight, threaded, self-locking, cold-weld type wedge adapter. Connections shall be made wrench tight. Locknuts shall be the bonding type with sharp edges and shall be installed in a manner that will assure a locking installation. Locknuts and bushings or self-locking adapters will not be required where conduits are screwed into threaded connections. Conduit runs shall be protected from the entrance of foreign material prior to the installation of conductors.
- H. Conduit or tubing deformed or crushed in any way shall not be installed. Conduit shall be bent only with approved bender (hydraulic or hickey). Bending machines shall be used to make field bends in conduit of 1-1/4 inch size and larger. Torches shall not be used in making conduit bends.
- I. Raceways shall be spaced at least 6 inches from parallel runs of heating system pipes, flues, other high temperature piping systems, and other heat sources. This basic spacing shall be increased if necessary to ensure that raceways experience no significant temperature rise from external sources. Raceways shall not be embedded in any spray applied insulation, fireproofing, or other materials that would restrict heat dissipation.
- J. Pull wires shall be provided in spare and unused conduits. (Nylon "jet-line" or as approved.)
- K. Clean conduits 3 inches and larger utilizing conduit mandrels.
- L. Conduits stubbed up out of floor and terminating inside of an enclosure shall have insulating grounding bushings installed.
- M. Raceways penetrating vapor barriers or traversing from warm to cold areas shall be sealed on the inside with a non-hardening duct sealing compound to prevent the accumulation of moisture and shall be taped airtight to the vapor barrier on the outside. Refer to Section 26 00 00 for additional requirements and limitations regarding penetration of vapor barriers. Larger conduits (2-1/2 inch and larger) shall be sealed with Polywater FST two part foam sealant or approved equal on warm indoor side of penetration.

- N. Raceways (particularly PVC) shall be provided with expansion joints where necessary to allow for thermal expansion and contraction. Set initial opening of expansion joints per manufacturer's instructions, to suit the ambient temperature at the time of installation.
- O. Provide flexible conduit connection at seismic joints to allow for displacement of conduit in all three axes. Provide appropriate lengths of flexible conduits at seismic joints and appropriate amounts of slack in conduit to allow movement of conduit/cablings in accordance with the design of the seismic joint. Slack shall be maintained in conduit after cabling is installed. Minimum lengths of flexible conduit and minimum amount of slack for various size conduits shall be as follows:
 - 1. 2 inch and greater: 4 foot length, 4-6 inches slack.
 - 2. 1-1/2 inch and smaller: 2 foot length, 3 inches slack.
- P. Flexible metal conduit with supplemental ground jumper shall be used for connection to vibrating equipment, or where installation conditions warrant its use with express permission. Flexible conduit shall not penetrate walls. Liquid-tight flexible conduit with supplemental ground jumper shall be used for motor and transformer connections (except utilize flexible metal conduit in plenum spaces). The ground jumper in flexible conduits shall be routed within the conduit.
- Q. Length of flexible conduit shall not exceed 36 inches, except for lighting fixture whips and where specifically noted. Fixture whips shall not exceed 72 inches. Flexible conduit shall not penetrate walls or vapor barrier retarder/barrier.

3.03 RACEWAY INSTALLATION METHODS – TELECOMMUNICATIONS SYSTEMS

- A. Installation methods for telecommunication system conduits shall comply with Installation Methods – General, above, unless superseded by more stringent requirements of this section.
- B. Telecommunications conduits shall comply with the requirements of TIA/EIA-569-A and the Building Industry Consulting Service International (BICSI) Telecommunications Distribution Methods Manual. Note that some of these requirements are more stringent than the requirements of the National Electrical Code.
- C. There shall be no more than two 90-degree bends between pull points in telecommunications conduit. Pull boxes added to conduit runs as a result of this requirement shall be in accordance with this Section. If it is not practical to install a pull box in the run due to field conditions, the conduit size shall be increased to the next trade size for each additional 90-degree bend. Offsets shall be considered as equivalent to a 90-degree bend.
- D. Inside radius of conduit bends shall be at least 6 times the internal diameter of the conduit for sizes up to 2 inch trade size; 10 times the internal diameter of the conduit for sizes larger than 2 inch trade size. Where bending machine shoes are not available with the required bending radius for a one-shot field bend, factory bent, large radius 90-degree elbows shall be provided.
- E. Conduits stubbed to cable trays shall be terminated within a maximum horizontal distance of 4 inches from the tray and in a vertical zone between 1 to 6 inches above tray. Conduits shall be supported from structure within a maximum horizontal distance of 12 inches from the tray. Conduits shall be provided with a grounding bushing and shall be bonded to the cable tray with a minimum 12 AWG copper conductor.
- F. Use of flexible conduit for telecommunications shall be kept to a minimum and shall be at the discretion of the Contracting Agency. Obtain prior written approval for the use of flexible conduit. Where required due to physical considerations, flexible metal conduit may be allowed in lengths not exceeding 4 feet. If used, flexible metal conduit shall be increased by one trade size for the application used (see Conduit Sizes).
- G. Conduits entering the telecommunications room or equipment room through the floor shall be terminated 4 inches above finished floor. Conduits entering the telecommunications room or equipment room from above shall be terminated 4 inches below the finished ceiling, but in no case shall the conduits terminate more than 12 inches above the cable pathway support or

distribution frame.

- H. Conduit sleeves connecting vertically “stacked” telecommunications rooms shall be terminated 4 inches above finished floor. Conduits and cutout openings between floors shall be sealed with firestopping material that is reusable, to accommodate additions and deletions, moves and changes in the cabling system.
- I. Layout of conduits shall give consideration to nearby sources of electromagnetic energy such as electrical power wiring, large electric motors and generators, induction heaters, arc welders, variable frequency drives, etc. Maintain the greatest separation practicable between telecommunication raceways and sources of electromagnetic interference (EMI). A minimum of 5 inches of separation shall be maintained between telecommunication raceways and fluorescent lighting ballasts.
- J. Pull wires shall be provided in spare and unused conduits. (Nylon “jet-line” or as approved.)
- K. Maintain minimum separation from \leq 480V power wiring in accordance with the following table:

Condition	Minimum Separation Distance		
	< 2 kVA	2-5 kVA	> 5 kVA
Unshielded power lines or electrical equipment in proximity to open non-metal telecommunications pathways	5 inches	12 inches	24 inches
Unshielded power lines or electrical equipment in proximity to a grounded metal telecommunications conduit pathway	2.5 inches	6 inches	12 inches
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a grounded metal telecommunications conduit pathway	--	3 inches	6 inches

3.04 CONDUIT SIZES – GENERAL

- A. Minimum sizes for rigid steel, IMC, FRE, rigid aluminum and PVC-40 conduits shall be ¾ inch.
- B. Minimum size for EMT shall be ½ inch.
- C. Minimum size for flexible conduits shall be ½ inch , except fixture whips may be 3/8 inch as allowed by the NEC.
- D. Maximum size for EMT shall be 3 inch, except telecom backbone conduits may be 4 inch where shown on the Drawings.

3.05 CONDUIT SIZES – TELECOMMUNICATIONS SYSTEMS

- A. Minimum size for conduit runs to outlets is 1 inch.
- B. Unless indicated otherwise, individual conduit homeruns shall serve no more than three telecommunications outlets.

3.06 STRUCTURAL COORDINATION

- A. Layout conduits in slabs to avoid compromising structural integrity. Obtain approval from Structural Engineer for maximum conduit sizes, quantities, arrangement, and placement in structural slabs.
- B. Structural members shall not be cut, drilled, or notched for raceways or other electrical features unless specifically accepted by the Contracting Agency.

- C. Underfloor raceways for slab-on-grade construction shall be embedded in the fill under the slab, not in the slab itself. Where raceways are required or permitted to be embedded in concrete, the thickness of concrete on all sides of each raceway shall not be less than 2 inches.
- D. X-ray concrete prior to core drilling. Do not core drill cut conduit with prior approval from structural and the Owner. Do not cut rebar without specific authorization from the Contracting Agency. Protect existing equipment and building finishes prior to performing core drills. Replace or repair equipment and/or building finishes damaged during core drilling operations as directed by the Contracting Agency.

3.07 EXISTING CONDUIT

- A. Accurately measure the physical length of all existing underground conduits by the use of True Tape or an approved equivalent prior to the purchase or installation of any cable, wire, or innerduct. Costs incurred as a result of not obtaining accurate lengths of underground conduits prior to the purchase or installation of cable, wire, or innerduct; such as the need to replace cable, wire or innerduct, or splice cable or wire, or provide an additional junction box or pull point, shall be the responsibility of the Contractor.

3.08 SURFACE RACEWAY INSTALLATION

- A. Install Products in accordance with manufacturer's instructions.
- B. Use flat-head screws, clips, and straps to fasten raceway channel to surfaces. Mount plumb and level.
- C. Provide outlets in locations shown or according to spacing specified on the Drawings. Where spacing is specified, the maximum distance from each end of the raceway to the first outlet shall not exceed one-half of the specified spacing distance. Mounting elevations shall be as noted on the Drawings or as shown on the Architectural Elevations. If a conflict exists, the elevation shown on the Architectural Elevations shall take precedence.
- D. Provide field paint touch-up with factory furnished paint to match factory pre-painted finish, for all chips, scraps, scratches, fittings and unpainted sections of the surface raceways and multi-outlet assemblies, after installation of all devices and covers are complete.
- E. Provide appropriate separate device finish plates for outlets and telecommunication jacks as specified in other Sections.
- F. Use suitable insulating bushings and inserts at connections to outlets and corner fittings.
- G. Close ends of wireway and unused conduit openings.
- H. Ground and bond raceways, multi-outlet assemblies and wireways under provisions of Section 26 05 26 – Grounding and Bonding for Electrical Systems.

3.09 OUTLET BOX INSTALLATION

- A. Outlet boxes shall be securely fastened in position and supported independently of the conduit system.
- B. Outlet boxes located in suspended ceiling system shall be fastened to ceiling "t-bar" system with bar-hanger rods manufactured for the purpose, or from hanger rods with solid supports from structure above. "T-bar" hanger rods shall be clipped to cross-members supported by the main ceiling support members. Outlet boxes supported from the suspended ceiling system shall be provided with one safety wire attached to the box or box support clip, or two safety wires attached to the bar hanger.
- C. Boxes shall be installed true to the building lines and at equal heights in conformity with mounting heights specified in other sections of the specification.
- D. Provide the best suitable box for each outlet requirement. Extension rings shall not be used on new construction except where needed to bring an outlet box out to 1/8 inch of the finished

wall or ceiling line.

- E. Boxes shall have only the holes necessary to accommodate the conduits at point of installation. All boxes shall have lugs or ears to secure covers.
- F. Boxes shall be rigidly secured in position. Recessed boxes shall be so set that the front edge of the box shall be flush with the finished wall or ceiling line, or not more than 1/8 inch back of same. This requirement is more stringent than NEC requirements.
- G. Boxes shall be accessible.
- H. Provide boxes for each application that will not violate the fire rating of the wall, floor or ceiling assembly in which the box is installed.
- I. Do not place order for floor boxes without ensuring that the Contracting Agency has positively approved submittals for the specific cover types/styles colors necessary for all applications and locations.
- J. Recessed boxes shall not be placed back-to-back in adjacent rooms. They shall be offset at least 12 inches, or greater as required by codes and standards applicable to the specific construction.
- K. Boxes (electrical boxes, outlet boxes and telecommunication boxes, etc) penetrating fire rated walls, walls with vapor retarder/barriers, wall types that extend to structure or wall types that contain batts shall be sealed airtight with approved Firestop Putty Pads to reduce sound transmission, reduce air transmission and increase fire resistance. Mold putty pads around electrical junction boxes and conduits to form an airtight seal in accordance with manufacturer's installation instructions.

3.10 JUNCTION BOX AND PULL BOX INSTALLATION

- A. Junction and pull boxes shall be installed so that covers are readily accessible and adequate working clearance is maintained after completion of the installation.
- B. Select boxes properly sized per NEC for power and lighting applications.

3.11 TELECOMMUNICATIONS SYSTEM PULL BOXES

- A. Where a pull box is required in a 1 inch conduit run, outlet boxes as specified in this Section may be used. Where a pull box is required in a conduit run 1 1/4 inch or larger, or where required for multiple raceways, the box shall be sized in accordance with the Table in this Section.
- B. Pull boxes shall be located in straight-through sections of horizontal cabling pathways (conduits). Pull boxes shall not be used for angle pulls or to accomplish changes in direction of the pathway.
- C. Multiple raceways connecting to telecommunications system pull boxes shall penetrate box walls such that they are distributed evenly along the Box wall.

3.12 TELECOMMUNICATIONS SYSTEM JUNCTION BOXES

- A. Unless otherwise specified or noted on the Drawings, junction boxes shall not be used in interior horizontal pathway conduits or interior backbone pathway conduits. Where allowed, junction boxes shall be located in a readily accessible location. Junction boxes shall not be located in above ceiling spaces.
- B. Junction boxes for telecommunication shall be hinged covered cabinets, sized in accordance with the requirements of ANSI/EIA/TIA-569-A.

END OF SECTION

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide identification on all equipment, raceways, boxes and conductors.
- B. Section includes:
 - 1. Nameplates
 - 2. Labels
 - 3. Wire markers
 - 4. Conduit markers
 - 5. Miscellaneous Electrical Identification
- C. Related Sections: Divisions 26 and 28 Sections.

1.02 SUBMITTALS

- A. Division 1 and Section 26 00 00 - Electrical General Requirements.
- B. Product Data:
 - 1. Submit manufacturer's catalog literature for each product required.
 - 2. Submit electrical identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.

1.03 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.04 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

PART 2 - PRODUCTS

2.01 NAMEPLATES

- A. Electrical Equipment Labels and Nameplates
 - 1. Name equipment in accordance with Contract Documents.
 - 2. Nameplates shall be laminated plastic, 0.125 inch thick, with matte finish and square corners. Minimum lettering size as noted elsewhere in this section.
 - a. Label and Nameplate Colors:
 - 1). Normal Equipment: White letters on a black background. 2). Emergency Equipment: White letters on a red background.

- b. Securely attach labels with threaded fasteners or pop-rivets. Adhesive attachment not acceptable.
 - c. Temporary markings not permitted on equipment. Repaint trims, housings, etc., where markings cannot be readily removed. Refinish defaced finishes.
3. Include item designation and branch circuit designation (panel and circuit number) on disconnects, starters, equipment and device nameplates, e.g., "FAN No. 4, Circuit LA-30").

2.02 WIRE AND CABLE MARKERS

- A. Wire and Cable Markers: Wrap on labels, cloth tape type wire markers or tubing type for all phase, neutral and ground conductors.

2.03 LABELS

- A. Adhesive film label with clear protective overlay: Machine printed, in black, by thermal transfer process or equivalent. Minimum lettering size as noted elsewhere in this section. Overlay shall provide a weatherproof and UV resistant seal for label.

2.04 UNDERGROUND ELECTRICAL LINE PLASTIC LINE MARKER

- A. Minimum 4 inch wide plastic tape with metallic core with suitable legend describing buried electrical lines.

PART 3 - EXECUTION

3.01 NAMEPLATE INSTALLATION

- A. Install nameplate parallel to equipment lines.
- B. Mechanically fasten nameplates using threaded fasteners or pop rivets.
- C. Mechanical fasteners shall have no sharp edges or points which can damage conductors or injure personnel.
- D. Temporary markings are not permitted on equipment. Repaint trims, housings, etc., where markings cannot be readily removed. Refinish defaced finishes.
- E. No labeling abbreviations are permitted without prior approval.

3.02 NAMEPLATE LOCATIONS

- A. Provide 1/2 inch minimum height letters on following equipment:
 - 1. Special equipment housed in cabinets, as designated on plans, on outside of door.
 - 2. Equipment housed in equipment cabinets, as designated on plans, on inside of cabinet door.
 - 3. Emergency system equipment, boxes and enclosures, as designated on plans, on outside of equipment, boxes and enclosures.
 - 4. Control or low voltage system panels such as Fire Alarm, PA, Security, Video Surveillance, etc., with the following information:
 - a. Line 1: Unique panel name as shown on the shop drawings.
 - b. Line 2: System description such as Fire Alarm, Security, etc.
 - c. Line 3: Panelboard and circuit number from which the panel is fed if applicable.
- B. Provide 1/4 inch minimum height letters on:
 - 1. Disconnects, starters, VFDs and contactors:
 - a. Line 1: Load Served (Use nameplate designation for source).
 - b. Line 2: Panelboard and circuit number from which the device is fed.
 - c. Line 3: Voltage, Phase, fuse size or circuit breaker size.

2. Lighting control relays, dimmer controls and remote lighting control equipment.
3. Switches and receptacles where item controlled is not visible from the switch, or as noted on Drawings.
4. External Power Sources: Provide 1/4 inch white letters on red background on all starters or controllers that receive power from an external source that is not de-energized by operating the associated disconnecting means.
5. Designated electrical equipment.

3.03 RECEPTACLE AND LIGHT SWITCH DEVICE PLATES

- A. Provide 3/16 inch minimum height letters on receptacle and light switch device plates:
 1. Provide clear adhesive label (black letter on clear background) indicating branch circuit designation (panel and circuit number) on receptacle and light switch device plates, e.g., "NPA-30"). Labels shall be printed not hand written.

3.04 TELECOMMUNICATION LABELING REQUIREMENTS.

- A. Provide machine printed labels for all telecommunication racks, cabinets, patch panels, cables, outlets, etc., in accordance with ANSI/TIA/EIA-606-B. Provide labeling nomenclature in accordance with information on the Drawings or Owner's labeling conventions. Submit labeling samples for all required applications.
- B. Machine Printed Label Requirements:
 1. PC Compatible.
 2. Can save and modify files.
 3. Fully integrated with AutoCAD.
 4. Editable Fonts and Sizes.
 5. Rotate Text and Objects.
 6. Vary Line Spacing.
 7. Ability to import graphical images.
 8. Capable for customization of layout.
 9. Re-positional labels.
- C. Basis of Design:
 1. Brady Electrical/Datacomm Worldwide (latest version of LabelMark).
 2. Cable Management Software International (latest version of docIT).
 3. Approved alternate.
- D. Labeling and color coding identification for this project shall conform to TIA/EIA-606-B for a Class 3 Administrative System.

3.05 LABEL LOCATIONS

- A. Provide 3/16 inch minimum height letters on the following equipment:
 1. Fire Alarm Device Labels:
 - a. Provide label on exterior surface of each initiating device denoting the unique device address corresponding to the text annunciator description. For detectors, the label shall be affixed to the base and not to the detector itself. For pull stations, the label shall be affixed to the top of the device and not to the vandal proof cover.
 - b. Provide label on each remote test station indicating description and location of device being tested.
 - c. Provide label on telecom conductors at each end denoting FACP lines for use with the digital alarm communicator transmitter (DACT).

3.06 DISTRIBUTION/BRANCH CIRCUIT PANELBOARD CIRCUIT LABELING

- A. Distribution Panels and Branch Circuit Panelboard Directories: For new or existing panels where circuits have been removed added or revised; provide neatly typed schedule (odd

numbered circuits on left side or top, even on right side or bottom) under plastic jacket or protective cover to protect the schedule from damage or dirt. Securely mount on inside face of panelboard door. Define briefly, but accurately, nature of connected load (i.e., Lighting Room 201, Receptacles Janitor Room 155, Etc.) as approved. Sequentially numbered schedules shall not be used.

- B. Use final approved room numbers from finished construction (not necessarily as indicated on the drawings).
- C. Provide numbering for terminals on terminal strips in the terminal enclosure that identifies the origin, function and destination of each conductor.
- D. Install wire marker for each conductor inside panelboards (phase, neutral and ground conductors). Locate label within 6 inches of termination. Labels shall be visible with panel dead front installed.
- E. Dedicated branch circuit(s) feeding fire alarm control unit(s) shall be identified as "FIRE ALARM CIRCUIT" in accordance with NFPA 72. The circuit disconnecting means shall be identified with red marking.
- F. Provide updated circuit directory in existing panelboards that are modified. Install directory in panelboard in protective cover and submit electronically in the O&M Manual.

3.07 EMERGENCY SYSTEM IDENTIFICATION

- A. Emergency circuits shall be permanently marked so they will be readily identified as a component of an emergency circuit or system by the following methods:
 - 1. All equipment, boxes and enclosures (including power panels, emergency inverters and equipment) for emergency circuits shall be permanently marked as a component of an emergency circuit or system.
 - 2. Where boxes or enclosures are not encountered, exposed cable or raceway shall be permanently marked to be identified as a component of an emergency circuit or system at intervals not to exceed 25 feet.

3.08 WIRE MARKER INSTALLATION

- A. Install wire marker for each conductor (phase, neutral and ground conductors) at panelboards, pull boxes, outlet and junction boxes, and each load connection. Locate label within 6 inches of termination in panelboards. Labels shall be visible with panel dead front installed.
- B. Wire markers are not required on conductors in a pull or junction box that contains only an individual branch circuit, however, source panel and circuit number shall be noted on pull or junction box cover as noted elsewhere in this section.
- C. Fire Alarm Circuits: Provide cable markers showing Notification Appliance Circuit (NAC) or Signaling Line Circuit (SLC) loop identification number at fire alarm junction boxes and pullboxes.
- D. Security System Cables: Install wire marker for each cable at cabinets, pull boxes, junction boxes, and each load connection. Wire ID number shall be as shown on security system shop drawings.
- E. Power Circuits: Panelboard name and branch circuit or feeder number.
- F. Control Circuits: Control wire number as indicated on schematic and/or shop drawings.
- G. Color Code:
 - 1. Color code phases, neutral, and ground per NEC requirements and Section 26 05 19 – Wire and Cable.
 - 2. Color code all low voltage system wiring in accordance with applicable Sections.

3.09 TRANSFORMERS

- A. Nameplate shall contain the following information:

1. Line 1: Transformer Name as noted on drawings and schedules.
 2. Line 2: KVA Rating/Primary/Secondary Voltage.
 3. Line 3: Source from which transformer is fed, "FED FROM: PANEL NHA"
 4. Line 4: Destination of transformer feed, "FEEDS: PANEL NPA.
- B. When the transformer disconnect is located in a remote location, the disconnecting means shall be labeled to reference the transformer location in accordance with NEC Article 450.

3.10 MISCELLANEOUS ELECTRICAL IDENTIFICATION

- A. Junction Boxes: Mark the circuit number(s) and panel source of wiring on all junction boxes with sheet steel covers. Mark with indelible black marker. On exposed junction boxes in finished areas mark on inside of cover.
- B. Conduits
1. Mark all conduits entering or leaving panelboards with indelible black magic marker with the circuit numbers of the circuits contained inside.
 2. Fire Alarm System: Paint fire alarm conduits with a 6 inch band 10 feet on center with red paint where installed in concealed accessible location (or provide red conduit in accordance with Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables and Section 26 05 33 – Raceways and Boxes for Electrical Systems. Where raceway is installed in exposed locations it shall be painted to match the adjacent surface.
 3. Empty Conduits: Provide tags with typed description of purpose, and location of opposite end, wired to each end of conduits.
- C. Junction Boxes
1. Markings shall be made with indelible black marker.
 2. On exposed junction boxes in finished areas markings shall be on inside of cover.
 3. Mark the circuit numbers of wiring on all junction boxes with sheet steel covers.
 4. Mark all Special System junction boxes with sheet steel covers with appropriate system designation, e.g., "Intercom", "Clock", "Telecom", "Video Surveillance", etc. Fire Alarm System: Paint all fire alarm junction boxes inside and out with red paint where installed in concealed accessible location. Where installed in exposed locations paint boxes to match the adjacent surface.
- D. Exterior underground power, control, signal and communications lines.
1. Install continuous underground plastic line marker located directly above line at 6 to 8 inches below finished grade. Where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches provide additional markers.
 2. Install markers for both direct buried and conduit encased conductors.
 3. Label each underground conductor with its circuit number or identification tag.
- E. Provide a label at the fire alarm control panel that identifies the panelboard and circuit number that supplies the control panel. Provide a red label adjacent to the circuit breaker inside the panelboard that clearly identifies the circuit breaker that feeds the control panel in accordance with NFPA requirements.

3.11 CODE REQUIRED MARKINGS AND WARNINGS:

- A. Provide all placards, markings and identification systems required by Code and/or the Contract Documents, such as (but not limited to):
1. Conductor insulation color identification.
 2. Special conductor identification and legends.
 3. Emergency systems markings.

END OF SECTION

NETWORK LIGHTING CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes specific requirements, products, and methods of execution relating to lighting controls, approved for use on this project.
- B. Related Sections
 - 1. 26 05 53 - Identification for Electrical Systems
 - 2. 26 27 26 - Wiring Devices
 - 3. 26 50 00 - Lighting Fixtures

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 SUMMARY

- A. Provide a Code Compliant Networked Lighting Control System as indicated on plans and outlined in this section.
- B. Control Devices under this section are shown diagrammatically on the drawings and additional Class 1 and/or Class 2 wiring may be required for a complete system. It shall be the responsibility of the contractor and system vendor to determine the quantity and type of cable/wiring required for the complete and proper operation of the system. System design is based upon intelligent controls and/or lighting fixtures interconnected with CAT5 cables.
- C. Provide material, labor and programming to provide a complete and properly working system that complies with listed sequences of operation.
- D. Proper product adjustment, testing, and training shall take place in compliance with this document as well as applicable energy codes and listed sequences of operation.

1.05 SUBMITTALS

- A. Provide Submittals for products in accordance with Section 26 00 00 - Electrical General Requirements and Division 1.

- B. Shop Drawings/Submittals shall include but not limited to:
 - 1. Layouts of photocells, occupancy sensors and networked devices necessary for a complete working system.
 - 2. Wiring diagrams showing the connection of all system parts and necessary electrical provisions to accommodate the intent of the design.
 - 3. Installation sheets with complete product information.
 - 4. Manufacturer Start-up Instructions and requirements.
 - 5. Manufacturer's warranty certificate.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis of controls design Manufacturer: nLight, Acuity Brands, One Lithonia Way, Conyers GA 30012, www.acuitycontrols.com

2.02 SYSTEM REQUIREMENTS

- A. System shall have an architecture that is based upon three main concepts; 1) intelligent lighting control devices 2) standalone lighting control zones 3) network backbone for remote or time based operation.
- B. Intelligent lighting control devices shall consist of one or more basic lighting control components; occupancy sensors, photocell sensors, relays, dimming outputs, manual switch stations, and manual dimming stations. Combining one or more of these components into a single device enclosure should be permissible so as to minimize overall device count of system.
- C. Intelligent lighting control devices shall communicate digitally, require <7 mA of current to function (Graphic wall stations excluded), and possess RJ-45 style connectors.
- D. Lighting control zones shall consist of one or more intelligent lighting control components, be capable of stand-alone operation, and be capable of being connected to a higher level network backbone.
- E. Devices within a lighting control zone shall be connected with CAT-5e low voltage cabling in any order.
- F. Lighting control zone shall be capable of automatically configuring itself for default operation without any start-up labor required.
- G. Individual lighting zones must continue to provide a user defined default level of lighting control in the event of a system communication failure with the backbone network or the management software becoming unavailable.
- H. Power for devices within a lighting control zone shall come from either resident devices already present for switching (relay device) or dimming purposes, controls enabled luminaires, or from the network backbone. Standalone "bus power supplies" shall not be required in all cases.
- I. All switching and dimming for a specific lighting zone shall take place within the devices located in the zone itself (i.e. not in remotely located devices such as panels) to facilitate system robustness and minimize wiring requirements. Specific applications that require centralized or remote switching shall be capable of being accommodated.
- J. System shall have one or more primary wall mounted network control "gateway" devices that are capable of accessing and controlling connected system devices and linking into an Ethernet LAN.
- K. System shall use "bridge" devices that route communication and distribute power for up to 8 directly connected lighting zones together for purposes of decreasing system

wiring requirements.

- L. System shall be capable of wirelessly connecting a lighting zone to a WiFi (802.11n) wireless data network for purposes of eliminating the “bridge” devices and all cabling that connects zones to bridge devices.
- M. System shall have a web-based software management program that enables remote system control, status monitoring, and creation of lighting control schedules and profiles.
- N. Individual lighting zones shall be capable of being segmented into several “local” channels of occupancy, photocell, and switch functionality for more advanced configurations and sequences of operation.
- O. Devices located in different lighting zones shall be able to communicate occupancy, photocell (non-dimming), and switch information via either the wired or WiFi backbone.
- P. System shall be capable of operating a lighting control zone according to several sequences of operation. System shall be able to change a spaces sequence of operation according to a time schedule so as to enable customized time-of-day, day-of-week, utilization of a space. Note: Operating modes should be utilized only in manners consistent with local energy codes.
 - 1. Auto-On / Auto-Off (via occupancy sensors)
 - a. Zones with occupancy sensors automatically turn lights on when occupant is detected.
 - b. Zones with occupancy and/or photocell sensors turn lights off when vacancy or sufficient daylight is detected.
 - c. Pressing a switch will turn lights off. The lights will remain off regardless of occupancy until switch is pressed again, restoring the sensor to Automatic On functionality.
 - 2. Manual-On / Auto-Off (also called Semi-Automatic)
 - a. Pushing a switch will turn lights on.
 - b. Zones with occupancy and/or photocell sensors turn lights off when vacancy or sufficient daylight is detected.
 - 3. Manual-On to Auto-On/Auto-Off
 - a. Pushing a switch will turn lights on.
 - b. After initial lights on, zones with occupancy and/or photocell sensors turn lights on/off according to occupancy/vacancy and/or daylight conditions.
 - c. Sequence can be reset via scheduled (ex. daily each morning) events.
 - 4. Auto-to-Override On
 - a. Zones with occupancy sensors automatically turn lights on when occupant is detected.
 - b. Zone lighting then goes into an override on state for a set amount of time, or until the next time event returns the lighting to an auto-off style of control.
 - c. Sequence can be reset via scheduled (ex. daily each morning) events.
 - 5. Manual-to-Override On
 - a. Pushing a switch will turn lights on.
 - b. Zone lighting then goes into an override on state for a set amount of time or until the next time event returns the lighting to an auto-off style of control.
 - c. Sequence can be reset via scheduled (ex. daily each morning) events.
 - 6. Auto On / Predictive Off
 - a. Zones with occupancy sensors automatically turn lights on when occupant is detected.
 - b. Zones with occupancy and/or photocell sensors turn lights off when vacancy or sufficient daylight is detected.
 - c. Pressing the switch will turn the lights off and a short “exit timer” begins.

After the timer expires, sensor scans the room to detect whether occupant is still present. If no occupancy is detected, zone returns to auto-on. If occupancy is detected, lights must be turned on via the switch.

7. Multi-Level Operation (multiple lighting levels per manual button press)
 - a. Operating mode designed specifically for bi-level applications.
 - b. Enables the user to cycle through up to four potential on/off/dim low/dim high lighting states using only a single button.
 - c. Eliminates user confusion as to which of two buttons controls which load.
 - d. Three different transition sequences are available in order to comply with energy codes or user preference).
 - e. Mode available as a setting on all devices that have single manual on/off switch (ex. nPODM, nPODM-DX, nWSX LV).
 - f. In addition to achieving bi-level lighting control by switching loads with relays, the ability to command dimming outputs to “step” in a sequence that achieves bi-level operation is present.
 - g. Depending on the sequence selected, every button push steps through relay/dimming states according to table below:

MLO Mode		State of load after each pushbutton press			
		1st Press	2nd Press	3rd Press	4th Press
2-State (Alternating)	Load A	On	Off	Off	-
	Load B	Off	On	Off	-
2-State (Both On, A First)	Load A	On	On	Off	-
	Load B	Off	On	Off	-
2-State (Both On, B First)	Load A	Off	On	Off	-
	Load B	On	On	Off	-
3-State	Load A	On	Off	On	Off
	Load B	Off	On	On	Off
A and B On ¹	Load A	On	Off	-	-
	Load B	On	Off	-	-
A On Only ¹	Load A	On	Off	-	-
	Load B	Off	Off	-	-
A and B On & Dim High ¹	Load A	High	Off	-	-
	Load B	High	Off	-	-
Dim Low /High	Load A	Low	High	Off	-
Dim Low / High	Load A	High	Low	Off	-

NOTE 1: Modes for use only when Auto-On state of Load A & B is different than first MLO state

- Q. A taskbar style desktop application shall be available for personal lighting control.
- R. An application that runs on “smart” handheld devices (such as an Apple® iPhone®) shall be available for personal lighting control.

2.03 INDIVIDUAL DEVICE SPECIFICATIONS

- A. Device Plates and Device Colors
 1. Device color for wall mounted devices shall match device color for wiring devices. Refer to Section 26 27 26 – Wiring Devices.

2. Device color for ceiling mounted devices shall be white.
 3. Device plate type and color shall match device plate type and color for wiring devices. Refer to Section 26 27 26 – Wiring Devices.
- B. System Controller
1. Product Series: nECY
 2. System Controller shall be multi-tasking, real-time digital control processor consisting of modular hardware with plug-in enclosed processors, communication controllers, and power supplies.
 3. System Controller shall have 32-bit microprocessor operating at a minimum of 1 GHz.
 4. System Controller shall have minimum of 512MB memory, with a minimum of 4GB non- volatile flash, to support its own operating system and databases.
 5. System Controller shall perform the following functions:
 - a. Time-based control of downstream wired and wireless network devices.
 - b. Facilitation of global network switch communication between different system controllers.
 - c. Linking into an Ethernet network.
 - d. Integration with Building Management Systems (BMS) and Heating, Ventilation and Air Conditioning (HVAC) equipment.
 - e. Connection to various software interfaces, including management interface, historical database and analytics interface, visualization interface, and personal control applications.
 6. System Controller shall have an integral web server to support configuration, diagnostics and hosting of software interfaces.
 7. Device shall have option for a graphical touch screen to support configuration and diagnostics.
 8. Device shall have three RJ-45 networked lighting control ports for connection to any of the following:
 - a. The graphical touch screen
 - b. Wired communication bridges
 - c. Direct connection to networked wired luminaires and intelligent lighting control devices (up to 128 total devices per port)
 9. Device shall be capable of communicating with wireless network bridges and software interfaces via LAN connection.
 10. Device shall automatically detect all networked devices connected to it, including those connected to wired and wireless communication bridges.
 11. Device shall have a standard and astronomical internal time clock.
 12. Device shall have 2 switched RJ-45 10/100 BaseT Ethernet ports for local area network (LAN) connection.
 - a. Ethernet connection shall support daisy chain wiring to other lighting control system LAN devices, such as other system controllers and wireless networked communication bridges.
 - b. Ethernet connection shall support IPv4 and shall be capable of using a dedicated static or DHCP assigned IP address.
 13. Device shall have 2 x USB 2.0 Expansion ports for 802.11 Wi-Fi Adapter enabling wireless connectivity including:
 - a. Hot Spot
 - b. Access Point
 - c. Client
 14. Each System Controller shall be capable of managing and operating at least 750 networked devices (wired or wireless).
 - a. Multiple System Controllers may be networked together via LAN connection to scale the system up to 20,000 networked devices.
 15. System Controller shall support BACnet/IP and BACnet MS/TP protocols to

directly interface with BMS and HVAC equipment without the need for additional protocol translation gateways.

- a. BACnet MS/TP shall support 9600 to 115200 baud rate.
 - b. System Controller shall be BACnet Testing Laboratory (BTL listed) using Device Profile BACnet Building Controller (B-BC) with outlined enhanced features.
16. System controller shall contain a "FIPS 140-2 Level 1 Inside" cryptographic module.
 17. System controller shall be available within a NEMA 1 enclosure with Class 1 and Class 2 separation
 - a. Enclosure shall support power input power of 120-277VAC, or optional 347VAC
 18. OpenADR Interface
 19. Product Series: nADR
 20. System shall provide an interface to OpenADR protocol Demand Response Automation Servers (DRAS) typically provided by local electrical utility.
 21. OpenADR interface shall meet all the requirements of Open ADR 2.0a Virtual End Nodes (VEN), including:
 - b. Programmable with the account information of the end-user's electrical utility DRAS account credentials.
 22. OpenADR interface shall support the activation of demand response levels defined in the utility demand response program.

2.04 WIRED NETWORKED DEVICES

- A. Wired Networked Wall Switches, Dimmers, Scene Controllers
 1. Product Series: nPODM, nPODM xS, nPODM xL
 2. Devices shall recess into single-gang switch box and fit a standard GFI opening.
 3. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
 4. All switches shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.
 5. Devices with mechanical push-buttons shall provide tactile and LED user feedback.
 6. Devices with mechanical push-buttons shall be made available with custom button labeling.
 7. Wall switches & dimmers shall support the following device options:
 - a. Number of control zones: 1, 2 or 4
 - b. Control Types
Supported: 1).
On/Off
2). On/Off/Dimming
3). On/Off/Dimming/Correlated Color Temperature Control for specific luminaire types
 - c. Colors: Ivory, White, Light Almond, Gray, Black, Red
 8. Scene controllers shall support the following device options:
 - a. Number of scenes: 1, 2 or 4
 - b. Control Types
Supported: 1).
On/Off
2). On/Off/Dimming
3). Preset Level Scene Type
4). On/Off/Dimming/Preset Level for Correlated Color Temperature
5). Reprogramming of other devices within daisy-chained zone so as to implement user selected lighting scene. This shall support manual start/stop from the scene controller, or optionally programmed to automatically end after a user selectable duration between 5 minutes

and 12 hours.

- 6). Selecting a lighting profile to be run by the system's upstream controller so as to implement a selected lighting profile across multiple zones. This shall support manual start/stop from the scene controller, or optionally programmed to automatically end after a user selectable duration between 5 minutes and 12 hours.

c. Colors: Ivory, White, Light Almond, Gray, Black, Red

B. Networked system occupancy sensors

1. Occupancy sensors shall sense the presence of human activity within the desired space and fully control the on/off function of the lights.
2. Sensors shall utilize passive infrared (PIR) technology, which detects occupant motion, to initially turn lights on from an off state, thus preventing false on conditions. Ultrasonic or Microwave based sensing technologies shall not be accepted.
3. For applications where a second method of sensing is necessary to adequately detect maintained occupancy (such as in rooms with obstructions), a sensor with an additional "dual" technology shall be used.
4. Dual technology sensors shall have one of its two technologies not require motion to detect occupancy. Acceptable dual technology includes PIR/Microphonics (also known as Passive Dual Technology or PDT) which both looks for occupant motion and listens for sounds indicating occupants. Sensors where both technologies detect motion (PIR/Ultrasonic) shall not be acceptable.
5. All sensing technologies shall be acoustically passive, meaning they do not transmit sounds waves of any frequency (for example in the Ultrasonic range), as these technologies have the potential for interference with other electronic devices within the space (such as electronic white board readers). Acceptable detection technologies include Passive Infrared (PIR), and/or Microphonics technology. Ultrasonic or Microwave based sensing technologies shall not be accepted.
6. Sensors shall be available with zero or one integrated dry contact switching relays, capable of switching 1 amp at 24 VAC/VDC (resistive only).
7. Sensors shall be available with one or two occupancy "poles", each of which provides a programmable time delay.
8. Sensors shall be available in multiple lens options which are customized for specific applications.
9. Communication and Class 2 low voltage power shall be delivered to each device via standard CAT-5 low voltage cabling with RJ-45 connectors.
10. All sensors shall have two RJ-45 ports or capable of utilizing a splitter.
11. All sensors shall have the ability to detect when it is not receiving valid communication (via CAT-5 connections) and blink its LED in a pattern to visually indicate of a potential wiring issue
12. Every sensor parameter shall be available and configurable remotely from the software and locally via the device push-button.
13. Sensors shall be able to function together with other sensors in order to provide expanded coverage areas by simply daisy-chain wiring together the units with CAT-5 cabling.
14. Sensors shall be equipped with an automatic override for 100 hour burn-in of lamps. This feature must be available at any time for lamp replacements.
15. Wall switch sensors shall recess into single-gang switch box and fit a standard GFI opening.
16. Wall switch sensors must meet NEC grounding requirements by providing a dedicated ground connection and grounding to mounting strap. Line and load wire connections shall be interchangeable. Sensor shall not allow current to pass to the load when sensor is in the unoccupied (Off) condition.

17. Wall switch sensors shall have optional features for photocell/daylight override, and low temperature/high humidity operation.
18. Wall switch sensors shall be available in four standard colors (Ivory, White, Light Almond, Gray)
19. Wall switch sensors shall be available with optional raise/lower dimming adjustment controls.
20. Wall switch sensors shall be the following nLight model numbers, with device color and optional features as specified:
 - nWSX** (PIR, 1 Relay)
 - nWSX PDT** (Dual Tech, 1 Relay)
 - nWSX LV** (PIR, No Relay)
 - nWSX PDT LV** (Dual Tech, No Relay)
 - nWSX LV NL** (PIR w/ Night Light, No Relay)
 - nWSX PDT LV NL** (Dual Tech w/ Night Light, No Relay)
 - nWSX LV DX** (PIR, No Relay, Raise/Lower Dim Ctrl)
 - nWSX PDT LV DX** (Dual Tech, No Relay, Raise/Lower Dim Ctrl)
21. Network system shall have sensors that can be embedded into luminaire such that only the lens shows on luminaire face.
22. Embedded sensors shall be capable of both PIR and Dual Technology occupancy detection
23. Embedded sensors shall have an optional photocell
24. Embedded sensors shall be the following nLight model number:
 - nES 7** (PIR, No Relay)
 - nES 7 ADCX** (PIR w/ Photocell, No Relay)
 - nES PDT 7** (Dual Technology, No Relay)
 - nES PDT 7 ADCX** (Dual Technology w/ Photocell, No Relay)
25. Network system shall also have ceiling, fixture, recessed, & corner mounted sensors available.
26. Sensors shall have optional features for photocell/daylight override, dimming control, and low temperature/high humidity operation.
27. Sensors shall be the following nLight model numbers, with device options as specified:

Model # Series	Occupancy Poles	# of Relays	Lens Type	Detection Technology
nCM(B) 9	1	-	Standard	PIR
nCM(B) 9 2P	2	-	Standard	PIR
nCM 9 RJB	1	-	Standard	PIR
nCM 9 2P RJB	2	-	Standard	PIR
nCM(B) PDT 9	1	-	Standard	Dual
nCM(B) PDT 9 2P	2	-	Standard	Dual
nCM PDT 9 RJB	1	-	Standard	Dual

nCM PDT 9 2P RJB	2	-	Standard	Dual
nCM(B) 10	1	-	Extended	PIR
nCM(B) 10 2P	2	-	Extended	PIR
nCM 10 RJB	1	-	Extended	PIR
nCM 10 2P RJB	2	-	Extended	PIR
nCM(B) PDT 10	1	-	Extended	Dual
nCM(B) PDT 10 2P	2	-	Extended	Dual
nCM PDT 10 RJB	1	-	Extended	Dual
nCM PDT 10 2P RJB	2	-	Extended	Dual
nRM 9	1	-	Standard	PIR
nRM PDT 9	1	-	Standard	Dual
nRM 10	1	-	Extended	PIR
nRM PDT 10	1	-	Extended	Dual
nRM 6	1	-	High Bay	PIR
nRM 50	1	-	Aisle Way	PIR
nWV 16	1	-	Wide View	PIR
nWV PDT 16	1	-	Wide View	Dual
nHW13	1	-	Hallway	PIR
nCM(B) 6	1	-	High Bay	PIR
nCM 6 RJB	1	-	High Bay	PIR

- C. Networked system daylight (photocell and/or dimming) sensors
1. Photocell shall provide for an on/off set-point, and a deadband to prevent the artificial light from cycling. Delay shall be incorporated into the photocell to prevent rapid response to passing clouds.
 2. Photocell and dimming sensor's set-point and deadband shall be automatically calibrated through the sensor's microprocessor by initiating an "Automatic Set-point Programming" procedure. Min and max dim settings as well as set-point may be manually entered.
 3. Deadband setting shall be verified and modified by the sensor automatically every time the lights cycle to accommodate physical changes in the space (i.e., furniture layouts, lamp depreciation, or lamp outages).
 4. Photocell and dimming sensors shall be equipped with an automatic override for 100 hour burn-in of lamps. This feature must be available at any time for lamp replacements. (Note: This function should be performed prior to any dimming of the lamps including the "auto set- point" setting.)
 5. Combination units that have all features of on/off photocell and dimming sensors shall also be available.
 6. A dual zone option shall be available for On/Off Photocell, Automatic Dimming Control Photocell, or Combination units. The second zone shall be capable of being controlled as an "offset" from the primary zone.
 7. Sensor shall be the following nLight model numbers, with device options as specified:

nCM(B) PC (RJB) (on/off)

nCM(B) PC DZ (RJB) (on/off control, dual zone)

nCM(B) ADCX (RJB) (remote automatic dimming control photocell)

nCM(B) ADCX DZ (RJB) (remote automatic dimming control photocell, dual zone)

nRM PC (on/off)

nRM PC DZ (on/off, dual zone)

nRM ADCX (remote automatic dimming control photocell)

nRM ADCX DZ (remote automatic dimming control photocell, dual zone)

8. Network system shall have dimming photocells that can be embedded into luminaire such that only the lens shows on luminaire face.
9. Embedded sensors shall be the following nLight model number:

nES ADCX (Dimming Photocell)

D. Networked System Power (Relay) Packs

1. Power Packs shall incorporate one Class 1 relay, a 0-10 VDC dimming output, and contribute low voltage power to the rest of the system. Secondary Packs shall incorporate the relay and 0-10 VDC or line voltage dimming output, but shall not be required to contribute system power. Power Supplies shall provide system power only, but are not required to switch line voltage circuit. Auxiliary Relay Packs shall switch low voltage circuits only.
2. Power Packs shall accept 120 or 277 VAC (or optionally 347 VAC), be plenum rated, and provide Class 2 power to the system.
3. All devices shall have two RJ-45 ports.
4. Every Power Pack parameter shall be available and configurable remotely from the software and locally via the device push-button.
5. Power Pack shall securely mount to junction location through a threaded ½ inch chase nipple or be capable of being secured within a luminaire ballast channel. Plastic clips into junction box shall not be accepted. All Class 1 wiring shall pass through chase nipple into adjacent junction box without any exposure of wire leads. Note: UL Listing under Energy Management or Industrial Control Equipment automatically meets this requirement, whereas Appliance Control Listing does not meet this safety requirement.
6. When required by local code, Power Pack must install inside standard electrical enclosure and provide UL recognized support to junction box. All Class 1 wiring is to pass through chase nipple into adjacent junction box without any exposure of wire leads.
7. Power Packs and Power Supplies shall be available that are WiFi enabled.
8. Power Packs (Secondary) shall be available that provide up to 16 Amp switching of all lighting load types.
9. Power Packs shall be available that provide up to 5 Amps switching of all lighting load types as well as 0-10 VDC dimming or fluorescent ballasts/LED drivers.
10. Specific Secondary Packs shall be available that provide up to 5 Amps of switching and can dim 120 VAC incandescent lighting loads or 120/277 VAC line voltage dimmable fluorescent ballasts (2-wire and 3-wire versions).
11. Specific Secondary Packs shall be available that provide up to 5 Amps of switching and can dim 120/277 VAC magnetic low voltage transformers.
12. Specific Secondary Packs shall be available that provide up to 4 Amps of switching and can dim 120 VAC electronic low voltage transformers.
13. Specific Power/Secondary Packs shall be available that are UL924 listed for

switching of Emergency Power circuits.

14. Specific Secondary Packs shall be available that control louver/damper motors for skylights.
15. Specific Secondary Packs shall be available that provide a pulse on/pulse off signal for purposes of controlling shade systems via relay inputs.
16. Power (Secondary) Packs shall be available that provide up to 20 Amps switching of general purposed receptacle (plug-load) control.
17. Power (Relay) Packs and Supplies shall be the following nLight model numbers:

nPP16 (Power Pack w/ 16A relay)

nPP16 D (Power Pack w/ 16A relay and 0-10VDC dimming output)

nPP16 WIFI (Power Pack w/ 16A relay, WIFI enabled)

nEPP5 D (Power Pack w/ 5A relay and 0-10VDC dimming output)

nSP16 (Secondary Pack w/ 16A relay)

nPP16 ER (UL924 Listed Secondary Pack w/ 16A relay for switching emergency power circuits)

nPP16 D ER UL924 Listed Secondary Pack w/ 16A relay and 0-10VDC dimming output for switching/dimming emergency power circuits)

nSP5 PCD 2W (Secondary Pack w/ 5A relay and incandescent dimming or 2-wire line voltage fluorescent dimming output)

nSP5 PCD 3W (Secondary Pack w/ 5A relay and 3-wire line voltage fluorescent dimming output)

nSP5 PCD MLV (Secondary Pack w/ 5A relay and magnetic low voltage dimming output)

nSP5 PCD ELV 120 (Secondary Pack w/ 4A relay and electronic low voltage dimming output)

nSP5 2P LVR (Louver/Damper Control Pack)

nSHADE (Pulse On/Off Control Pack)

nPP20 PL (Secondary Pack w/ 20A relay for general purpose receptacle load)

nPS 80 (Auxiliary Bus Power Supply)

nPS 80 WIFI (Auxiliary Bus Power Supply, WiFi enabled)

nAR 40 (Low voltage auxiliary relay pack)

E. Networked System Relay & Dimming Panels

1. Panel shall incorporate up to 4 normally closed latching relays capable of switching 120/277 VAC or up to 2 Dual Phase relays capable of switching 208/240/480 VAC loads.
2. Relays shall be rated to switch up to a 30A ballast load at 277 VAC.
3. Panel shall provide one 0-10VDC dimming output paired with each relay.
4. Panel shall power itself from an integrated 120/277 VAC supply.
5. Panel shall be capable of operating as either two networked devices or as one.
6. Panel shall supply current limited low voltage power to other networked devices connected via CAT-5.
7. Panel shall provide auxiliary low voltage device power connected wired directly to a dedicated terminal connection.
8. Power (Relay) Packs and Supplies shall be the following nLight model numbers:

nPANEL 4 (Panel w/ four 120/277 VAC relays and four 0-10 VDC dimming outputs)

nPANEL 2 480 (Panel w/ two dual phase relays (208/240/480 VAC) and two 0-10 VDC dimming outputs)

F. Networked Auxiliary Input / Output (I/O) Devices

1. Devices shall be plenum rated and be inline wired, screw mountable, or have an extended chase nipple for mounting to a ½" knockout.
2. Devices shall have two RJ-45 ports
3. Communication and low voltage power shall be delivered to each device via standard CAT- 5 low voltage cabling with RJ-45 connectors.
4. Specific I/O devices shall have a dimming control output that can control 0-10 VDC dimmable ballasts or LED drivers by sinking up to 20 mA of current.
5. Specific I/O devices shall have an input that reads a 0-10 VDC signal from an external device.
6. Specific I/O devices shall have a switch input that can interface with either a maintained or momentary switch and run a switch event (toggle the lighting load) or run a local/remote control profile.
7. Specific I/O devices shall sense state of low voltage outdoor photocells.
8. Specific I/O devices shall enable RS-232 communication between lighting control system and Touch Screen based A/V control systems.
9. Specific I/O devices shall sense momentary and maintained contact closures, and either toggle a connected load after a momentary contact or ramp the load high/low during a maintained contact (stopping when the contact releases).
10. Auxiliary Input/Output Devices shall be the following nLight model numbers:

nIO D (I/O device with 0-10 dimming output)

nIO 1S or **nIO RLX** (I/O device with contact closure or 0-10VDC dimming input)

nIO NLI (Input device for detecting state of low voltage outdoor photocell; sold in **nIO PC KIT** only)

nIO X (Interface device for communicating with RS-232 enabled AV Touch Screens)

G. Networked System Wall Switches & Dimmers

1. Devices shall recess into single-gang switch box and fit a standard GFI opening.
2. Communication and low voltage power shall be delivered to each device via standard CAT- 5 low voltage cabling with RJ-45 connectors.
3. All devices shall have two RJ-45 ports.
4. All devices shall provide toggle switch control. Dimming control and low temperature/high humidity operation are available options.
5. Devices shall be available in four colors (Ivory, White, Light Almond, Gray).
6. Devices with mechanical push-buttons shall provide tactile and LED user feedback.
7. Devices with mechanical push-buttons shall be made available with custom button labeling
8. Devices with a single "on" button shall be capable of selecting all possible lighting combinations for a bi-level lighting zone such that the user confusion as to which of two buttons (as is present in multi-button scenarios) controls which load is eliminated.
9. Wall switches & dimmers shall be the following nLight model numbers, with device options as specified:

nPODM (single on/off, push-buttons, LED user feedback)

nPODM DX (single on/off, single dimming raise/lower,

push-buttons, LED user feedback)

nPODM 2P (dual on/off, push-buttons, LED user feedback)

nPODM 2P DX (dual on/off, dual dimming raise/lower, push-buttons, LED user feedback)

nPODM 4P (quad on/off, push-buttons, LED user feedback)

nPODM 4P DX (quad on/off, quad dimming raise-lower, push-buttons, LED user feedback)

H. Networked System Graphic Wall Station

1. Device shall have a 3.5" full color touch screen for selecting up to 16 programmable lighting control preset scenes or acting as up to 16 on/off/dim control switches.
2. Devices shall be available in four colors (Ivory, White, Light Almond, Gray).
3. Device shall enable configuration of all switches, dimmers, and lighting preset scenes via password protected setup screens.
4. Device shall enable user supplied .jpg screen saver image to be uploaded.
5. Device shall surface mount to single-gang switch box.
6. Device shall be powered with Class 2 low voltage supplied locally via a directly wired power supply.
7. Device shall have a micro-USB style connector for local computer connectivity.
8. Device shall have two RJ-45 ports for communication
9. Device shall be the following nLight model number:

nPOD GFX

I. Networked System Scene Controllers

1. Device shall have two, three, four, or eight buttons for selecting programmable lighting control profiles or acting as on/off switches.
2. Devices shall be available in four colors (Ivory, White, Light Almond, Gray).
3. Device shall recess into single-gang switch box and fit a standard GFI opening.
4. Devices shall provide LED user feedback.
5. Communication and Class 2 low voltage power shall be delivered to each device via standard CAT-5 low voltage cabling with RJ-45 connectors.
6. All devices shall have two RJ-45 ports.
7. Device shall be capable of reprogramming other devices in its zone so as to implement user selected lighting scene.
8. Device shall be capable of selecting a lighting profile be run by the system's upstream Gateway so as to implement selected lighting profile across multiple zones (and not just its local zone).
9. Device shall have LEDs indicating current selection.
10. Scene Selector device shall be the following nLight model number:

nPODM 2S (2 Scene, push-button)

nPODM 4S (4 Scene, push-button)

nPODM 4S DX (4 Scene, push-button,

On/Off/Raise/Lower) **nPODM 2L** (2 Adjustable

Preset Levels, push-button, On/Off) **nPODM 2L AB**

(2 Scene, push-button, On/Off/High/Low) **nPODM**

4L DX (4 Adjustable Preset Levels, push-button,

On/Off/Raise/Lower)

J. Communication Bridges

1. Device shall surface mount to a standard 4" x 4" square junction box.
2. Device shall have 8 RJ-45 ports.
3. Device shall be capable of aggregating communication from multiple lighting control zones for purposes of minimizing backbone wiring requirements back to

Control Gateway.

4. Device shall be powered with Class 2 low voltage supplied locally via a directly wired power supply or delivered via a CAT-5 cabled connection.
5. Device shall be capable of redistributing power from its local supply and connect lighting control zones with excess power to lighting control zones with insufficient local power. This architecture also enables loss of power to a particular area to be less impactful on network lighting control system.
6. Communication Bridge devices shall be the following nLight model numbers:
nBRG 8 (8 Ports)

2.05 LIGHTING CONTROL PROFILES

- A. Changes to the operation of the system shall be capable of being made in real-time or scheduled via lighting control profiles. These profiles are outlines of settings that direct how a collection of devices function for a defined time period.
- B. Lighting control profiles shall be capable of being created and applied to a single device, zone of devices, or customized group of zones.
- C. All relays and dimming outputs shall be capable of being scheduled to track or ignore information regarding occupancy, daylight, and local user switches via lighting control profiles.
- D. Specific device parameters (e.g. sensor time delay and photocell set-point) shall be configurable via a lighting control profile.
- E. All lighting control profiles shall be stored on the network control gateway device, with a system backup on the software's host server.
- F. Lighting control profiles shall be capable of being scheduled to run according to the following calendar options: start date/hour/minute, end date/hour/minute, and sunrise/sunset +/- timed offsets.
- G. Sunrise/sunset times shall be automatically derived from location information using an astronomical clock.
- H. Daylight savings time adjustments shall be capable of being performed automatically, if desired.
- I. Lighting control profile schedules shall be capable of being given the following recurrence settings: daily, weekday, weekend, weekly, monthly, and yearly.
- J. Software shall provide a graphical tool for easily viewing scheduled lighting control profiles.

2.06 MANAGEMENT SOFTWARE

- A. Every device parameter (e.g. sensor time delay and photocell set-point) shall be available and configurable remotely from the software
- B. The following status monitoring information shall be made available from the software for all devices for which it is applicable: current occupancy status, current PIR Status, current Microphonics Status, remaining occupancy time delay(s), current photocell reading, current photocell inhibiting state, photocell transitions time remaining, current dim level, device temperature, and device relay state(s).
- C. The following device identification information shall be made available from the software: model number, model description, serial number, manufacturing date code, custom label(s), and parent network device.
- D. A printable network inventory report shall be available via the software.
- E. A printable report detailing all system profiles shall be available via the software.
- F. Software shall require all users to login with a User Name and Password.
- G. Software shall provide at least three permission levels for users.

- H. All sensitive stored information and privileged communication by the software shall be encrypted.
- I. All device firmware and system software updates must be available for automatic download and installation via the internet.
- J. Software shall be capable of managing systems interconnected via a WAN (wide area network)

2.07 BMS COMPATIBILITY

- A. System shall provide a BACnet IP gateway as a downloadable software plug-in to its management software.
- B. BACnet IP connection shall also be available utilizing JACE-600 hardware unit.
- C. BACnet IP hardware shall be capable of supporting up to 1500 total devices across up to 5 total Gateways
- D. BACnet IP connection shall communicate information gathered by networked system to other building management systems.
- E. BACnet IP connection shall translate and forward lighting relay and other select control commands from BMS system to networked control devices via profiles stored in the system Gateway. All system devices shall be available for polling for devices status.
- F. BACnet IP hardware device shall be the following nLight model name:

nBACnet

2.08 SYSTEM ENERGY ANALYSIS & REPORTING SOFTWARE

- A. System shall be capable of reporting lighting system events and performance data back to the management software for display and analysis.
- B. Intuitive graphical screens shall be displayed in order to facilitate simple viewing of system energy performance.
- C. An "Energy Scorecard" shall be display that shows calculated energy savings in dollars, KWHr, or CO2.
- D. Software shall calculate the allocation of energy savings to different control measures (occupancy sensors, photocells, manual switching, etc).
- E. Energy savings data shall be calculated for the system as a whole or for individual zones.
- F. A time scaled graph showing all relay transitions shall be presented.
- G. A time scaled graph showing a zones occupancy time delay shall be presented
- H. A time scaled graph showing the total light level shall be presented.
- I. User shall be able to customize the baseline run-time hours for a space.
- J. User shall be able to customize up to four time-of-day billing rates and schedules.
- K. Data shall be made available via a .CSV file

2.09 START-UP & SUPPORT FEATURES

- A. To facilitate start-up, all devices daisy-chained together shall automatically be grouped together into a functional lighting control zone.
- B. All lighting control zones shall be able to function according to default settings once adequate power is applied and before any system software is installed.
- C. Once software is installed, system shall be able to auto-discover all system devices without requiring any commissioning.

- D. All system devices shall be capable of being given user defined names.
- E. All devices within the network shall be able to have their firmware upgraded remotely and without being physically uninstalled for purposes of upgrading functionality at a later date.
- F. All sensor devices shall have the ability to detect improper communication wiring and blink it's LED in a specific cadence as to alert installation/startup personnel.

2.10 PREPARATION

- A. Prior to beginning rough-in for the automatic lighting controls a pre-installation meeting is mandatory for all parties involved in the lighting control system installation, including the System Installer, the manufacturer's Factory Authorized Representative and the Owner's Representative if desired. All parties shall review the automatic lighting control shop drawings, the manufacturer's installation instructions, applicable regulations and any site conditions pertinent to installation of the automatic lighting controls. Verify placement of sensors and installation criteria.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install equipment in accordance with the manufacturer's instructions in the locations indicated on the Drawings. Proper judgment must be exercised in executing the installation so as to ensure proper operation in the available space and to overcome local difficulties due to space limitations or interference of structural components.
- B. Locate and aim occupancy sensors as required for complete and proper volumetric coverage within the range of coverage of controlled areas per the manufacturer's recommendations. Rooms shall have 90% minimum coverage to completely cover the controlled area. Coverage shall accommodate all occupancy habits of single or multiple occupants at any location within the room. The locations and quantities of sensors shown on the Drawings are diagrammatic and indicate only the minimum quantity and placement of sensors that are to be provided. Provide additional sensors if required to properly and completely cover the respective room.
- C. All occupancy sensors shall be installed in accordance with manufacturer's recommendations. All units shall be set to "automatic on" mode and the maximum time delay before turning off light fixtures. Verify proper operation of all sensors. The sensing units' coverage area shall be restricted if required to avoid sensing people or extraneous influences in adjacent areas or corridors. This shall be done by covering a portion of the sensing lens with white paper tape in accordance with manufacturer's recommendations.
- D. Contractor is to provide a sufficient quantity and layout of occupancy sensors to properly meet coverage and intended sequence of operation. Locations shall be carefully selected to insure that coverage patterns are unobstructed.
- E. Mount occupancy sensors and photocells in finished spaces according to manufacturer instructions. In unfinished spaces or where ceiling-type sensors are installed where there is exposed structure, mount the sensors in surface mounted outlet boxes.
- F. Mount exterior photocells on flush-mounted outlet boxes.
- G. Wiring shall be arranged as shown on the shop drawings. Wiring and cable shall be installed in raceways or cable trays, except low-voltage cables run above accessible ceilings. Raceways shall be grounded to the power system ground.
 - 1. CAT5 cables connect control devices in uninterrupted continuous runs without intermediate splices. Cables shall be free from shorts or ground and shall be

- tested.
2. Cables shall be routed so as to maintain a separation of at least 610 mm (24 in) from all heat sources and from ballasts, transformers, dimmers and other sources of electromagnetic interference. Avoid exposed cables in occupied areas or in areas where they might be damaged as a result of normal use of the area. Where two (2) or more cables run in parallel, they shall be bundled with cable ties
 3. Cables run exposed in ceiling cavities shall be supported by means of suitable cable support devices from the building structure. They shall not lie upon the ceiling, nor shall they be supported from the ceiling frame, ceiling suspension wires, conduits, pipes, ductwork or lights. Supports shall be spaced no further apart than 4 feet on center.
 4. Care shall be exercised during cable installation not to damage cable insulation. Damaged cables shall be removed and replaced. Type and spacing of supports shall ensure that cable will not kink or sag.
 5. In each cable that terminates at a ceiling device, provide 305 mm (12 in) of slack cable, neatly coiled, to facilitate future modifications. Terminations shall be made in a neat and workmanlike manner.
 6. Terminate the manufacturer's recommended cable type to the appropriate termination point (RJ45 jack, etc.). Do not use CAT 5 cable for terminating to blocks.
 7. Cabling for 0-10V dimming control shall be installed in raceway (1/2" EMT), except where installed above accessible ceiling. Raceway shall be installed orthogonal to room surfaces, and be concealed by structure wherever possible.
 8. CAT5 networked control cable shall be run orthogonal to room surfaces, be routed along edges of rooms and concealed by structure wherever possible. Provide identification for control devices (Device ID #'s) per manufacturer instruction.

3.02 ADJUSTMENT, TESTING & DEMONSTRATION

- A. Notify the Owner's Representative and the Commissioning Authority at least two (2) weeks in advance of the date of each test, to allow witnessing of the tests if desired.
- B. The automatic lighting control devices are subject to commissioning. Assist the Commissioning Authority with scheduling and coordinating commissioning activities, developing commissioning test procedures, conducting commissioning tests, preparing commissioning documentation, and developing a training plan in accordance with specific responsibilities as assigned in Section 019100 and Section 260510. Prior to the start of functional performance testing for commissioning purposes, complete all start-up and checkout procedures and verify that the equipment is completely ready to be tested. A knowledgeable electrician in the employ of the Electrical Installer shall be present during functional performance testing for commissioning purposes.
- C. The contractor is to supply tools, instruments, gauges, testing equipment, protective devices and safety equipment for adjustment, testing and demonstration as needed.
- D. Prior to system testing, prepare a list of the devices to be tested, together with the associated location of each device and device identification (bar code number, ID, etc.). Include space to indicate test response for each device.
- E. During adjustment and testing, carefully record all settings and all test results, including expected test results, actual test results, and corrective actions taken. Records shall be submitted to the Architect's Consultant and included in the Operating & Maintenance Manuals. Settings of devices from software is acceptable documentation
- F. Initial Set-up: Verify that wiring is correctly connected to each device. Adjust controls

to function as specified under the sequence of operation. Settings shall comply with direction received from the Architect's Consultant and/or sequence of operation. Default to IES light levels if information is not available at time of initial set up.

- G. Verify sensor placement, aiming, calibration and settings to ensure trouble-free operation. Final calibration of daylight harvesting sensors and controls shall be delayed until room finishes have been completed and window treatments have been installed and are operable. Lower blinds and set the blades perpendicular to the window before calibrating day lighting controls.
- H. For each room with day lighting controls calibration shall be performed on a day with sufficient daylight. Additional visits shall be scheduled as necessary if conditions are not correct for calibration. Follow manufacturer recommendations.
- I. Program sequences of operation that include time functions to operate at times selected by the Owner's Representative. Information must be available before technician is scheduled for start- up.
- J. Field Testing: Test all system features for proper function. Tests to be performed shall include, but not be limited to, the following:
 - 1. Verify the sequence of operation for each device.
 - 2. Verify the setting and accuracy of each timing function in each device.
 - 3. Verify that each manual override control functions properly.
 - 4. Verify that occupancy sensors do not remain actuated due to normal conditions (e.g., air movement).
 - 5. Verify that occupancy sensors are actuated by hand motion within the entire area of coverage.
 - 6. Verify that occupancy sensors actuate when a person enters the area of coverage.
 - 7. Measure the illumination level in daylight zones equipped with daylight harvesting controls.
 - 8. Correct any deficiencies discovered as a result of the above testing, and completely retest the work affected by such corrections as part of the required installation and testing.

3.03 ON-SITE TRAINING

- A. After the system has been completed, tested and is operating properly, the manufacturer's representative shall demonstrate by actual usage, the proper operation of each system device and function in the presence of the Owner's Representative. Demonstration shall include repetition of selected field tests, as well as additional adjustment or testing required to demonstrate that the system performs in accordance with the operational description as specified herein and the Owner's operational requirements.
- B. The training shall be conducted after the Operating and Maintenance Manuals for the project are completed and available for use during the training session.
- C. Conduct two (2) hours minimum of training for the Owner's maintenance personnel in the operation and maintenance of the lighting controls and applicable software. Training time shall be extended as necessary to satisfy the Owner's Representative that all pertinent topics have been adequately covered.
- D. Maintain a training sign-in sheet, upon which participants in the training session, including the instructors, shall record their names. The training sign-in sheet shall be dated.
- E. On-site training shall follow a written training plan, prepared in advance. The training plan shall outline the topics to be covered, the publications to be used, and the training schedule.
- F. The training shall be conducted by technicians who are thoroughly familiar with the

equipment and its features, and also with the Project. The training shall include instruction, field demonstration, and over-the-shoulder hands-on exercises. As a minimum, the training shall cover, but not be limited to, the following topics:

1. General overview of lighting controls, including purpose and principle of operation.
 2. Location of lighting control components.
 3. Interpretation of equipment output devices, such as indicators and status contacts.
 4. Control adjustments and settings.
 5. Operation of system controls, including over-ride switches.
 6. Recommended maintenance procedures and intervals.
 7. Operation of system software.
- G. At the conclusion of the training session, obtain written sign-off from the Commissioning Authority and the Owner's Representative. Insert a copy of the sign-off form and the training sign-in sheet into the Operating and Maintenance Manuals.

END OF SECTION

WIRING DEVICES

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes general provisions, products and methods of execution relating to line voltage wiring devices for use on this project.
- B. Related Sections
 - 1. 26 05 33 - Raceway and Boxes for Electrical Systems

1.02 REFERENCES

- A. National Electrical Manufacturers Association:
 - 1. NEMA WD 1 - General Requirements for Wiring Devices.
 - 2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.03 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.04 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.05 SUBMITTALS

- A. Provide submittals for products in accordance with Section 26 00 00 - Electrical General Requirements and Division 1.
- B. Do not place order for devices, plates, etc., without ensuring that the Contracting Agency has positively approved submittals for the specific colors necessary for all applications and locations. Note that the selection of one color for general use does not rule out the selection of other colors for special applications or for aesthetic reasons.

1.06 QUALITY ASSURANCE

- A. Manufacturers mentioned and catalog numbers specified are for establishment of type, configuration and quality. Other manufacturers and types may be submitted for approval.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Catalog numbers shown are Hubbell unless noted otherwise. Equal devices manufactured by Arrow Hart (by Cooper Wiring Devices), Pass and Seymour, Leviton and Bryant are

acceptable. Provide all similar devices of same manufacturer.

2.02 SWITCHES

- A. Provide 20 AMP, 277V rated switches with UL listing for tungsten lamp loads or inductive loads without derating. Switches shall be as follows:

	20A Rated Switches
Single Pole	CAT. NO. 1221
Three-way	CAT. NO. 1223
Four-way	CAT. NO. 1224
Key Operated	CAT. NO. HBL1221-L
Momentary Cont.	CAT. NO. HBL1557
Double Pole	CAT. NO. 1222
Pilot Switch	CAT. NO. HBL1221-PL

- B. Multiple 277V switches shall be installed in partition boxes or shall be furnished with shields.
- C. Other switch types shall be provided as called for on the Drawings or as required by the application.

2.03 RECEPTACLES

- A. Provide grounding type receptacles as follows, or as required to match equipment furnished in this or other divisions.

Single Phase, 3-Wire Devices		
15A-125V	CAT. NO. HBL 5262	NEMA #5-15R
15A-125V GFCI	CAT. NO. HBL GF-15LA	NEMA #5-15R
15A-250V Single	CAT. NO. HBL 5661	NEMA #6-15R
Clock hanger 125V	CAT. NO. HBL 5235	NEMA #5-15R
20A-125V USB Charger Tamper Resistant	CAT. NO. HBL USB20X2	NEMA #5-20R
20A-125V	CAT. NO. HBL 5362	NEMA #5-20R
20A-125V GFCI	CAT. NO. HBL GF-20LA	NEMA #5-20R
20A-125 SPD	CAT. NO. HBL 5362SA	NEMA #5-20R
20A-125V Tamper Resistant	CAT NO. HBL 8300SG	NEMA #5-20R
20A-250V Single	CAT. NO. HBL 5461	NEMA #6-20R
30A-250V Dryer	CAT. NO. RR430F	NEMA #14-30R
50A-250V Range	CAT. NO. RR450F	NEMA #14-50R

- B. Outlets requiring ratings and configurations different from those listed above shall be provided as shown on the plans and/or required by the equipment served.

2.04 DEVICE COLOR

- A. Device color shall be selected and approved by Architect.

2.05 DEVICE PLATES

- A. Device plates in egress pathways shall be satin finished Type 302 stainless steel. Device plates in other areas shall be Lexan or high impact nylon, unless otherwise noted. Device plate color shall be selected and approved by Architect.
- B. Indoor device plates for surface mounted boxes shall be stainless or galvanized steel, with design to match the box and device type being used.
- C. Weatherproof outlet plates shall be of the safety outlet enclosure type that can be closed to remain weatherproof while in use. The outlet cover/enclosure shall be clearly marked "Suitable for Wet Locations While In Use" and "UL Listed". A gasket shall be provided between the enclosure and the mounting surface, and between the hinged cover and the mounting plate/base to ensure a proper seal. Enclosure shall be oversized depth, single-gang, vertical- mount, with non-locking latch, GFCI opening, cord openings, and cover; TayMac; Specification Grade or approved equal.
- D. Label receptacle and light switch plates in accordance with Section 26 05 53 – Identification for Electrical Systems.

2.06 PHOTOCELLS

- A. Outdoor Photocells
 - 1. Basis of design is Intermatic K4236C Stem and Swivel Mounting Photocell.
 - 2. Photocell shall have minimum of 2400 V open type spark gap arrestor to protect against voltage surges.
 - 3. Photocell shall be weatherproof or be provided with weatherproof case.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install wiring devices indicated complete with cover plates. Cover plates shall fit snugly against finished surfaces and line up true with adjacent building lines, and be symmetrical in location and appearance.
- B. Switches shall be installed so their handles move in a vertical plane.
- C. Door swings shall be checked and, if necessary, switches shall be relocated to place them on the strike side of the door.
- D. Unless otherwise noted on the drawings, receptacles shall be installed in the vertical position with the grounding pin down unless wording on the face of the device requires other mounting.
- E. Receptacles identified as Ground-Fault Circuit Interrupter (GFCI) type shall be provided as individual GFCI receptacles.

END OF SECTION

LIGHTING FIXTURES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section describes general requirements, products and methods of execution relating to lighting fixtures lamps, ballasts, LEDs, LED drivers and related products approved for use on this project.
- B. The Fixture Schedule is a general guide to type, quality and other characteristics. Fixtures of equal or better performance and quality may be substituted, subject to approval.

1.02 RELATED SECTIONS

- A. 26 27 26 - Wiring Devices

1.03 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.04 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.05 QUALITY ASSURANCE

- A. The fixture shall be a standard catalog item as described on the Drawings and as made by a nationally recognized manufacturer.
- B. Lamps specified in this Section shall be as manufactured by Osram Sylvania, Philips, General Electric or Venture.
- C. LEDs specified in this Section shall be as manufactured by Nichia, Samsung, or Cree.
- D. Ballasts specified in this Section shall be as manufactured by Osram, Advance, or Universal, unless noted otherwise.
- E. Drivers specified in this Section shall be as manufactured by Osram, GE, Advance, Phillips or endoLED, unless noted otherwise.

1.06 SUBMITTALS

- A. Provide submittals for all products in accordance with Section 26 00 00 and Division 1.
- B. Fixture mounting shall be clearly identified on submittal information and coordinated with architectural, features, assemblies, details and reflected ceiling plan.
- C. Fixtures and poles with color selections shall have color chips submitted for final color

selection by Architect.

- D. Lamps, ballasts, LEDs, LED Drivers and related products are generally included in the fixture schedule on the plans. Verify that the fixture types submitted for approval contain components complying with the product specifications of this Section.

1.07 SHOP DRAWINGS

- A. Provide fabrication drawings that indicate fixture, type, kind, weight, lamp, LEDs, ballast, LED drivers, method of fitting and fastening parts together, location and number of sockets, and complete details of method of fitting suspension and fastening fixtures in place. Verify fixture dimensions with construction conditions prior to ordering fixtures.
- B. Provide wiring diagrams that indicate supply power and interconnections for lighting controls, equipment and light fixtures. Provide sufficient information to assemble and install equipment at the project site without further instructions.

1.08 WARRANTY

- A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Interior lighting fixtures: 36 months from date of Substantial Completion.
 - 2. Exterior lighting fixtures and poles: 60 months from date of Substantial Completion.
 - 3. Controls mounted on or integral to lighting fixtures: 60 months from date of Substantial Completion.
 - 4. LEDs and LED Drivers: 60 months from date of Substantial Completion.
 - 5. Emergency Battery Ballasts and Drivers: 60 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide fixtures in conformance with the Fixture Schedule, with all required flanges and supports. Lighting fixtures shall be provided complete with all suspension, trim, mounting, and operating accessories normally considered necessary for a complete, functional, and safe installation, whether specifically called for in the Contract Documents or not.

2.02 LINEAR SYSTEMS

- A. Linear fixture systems shall be provided with all corners, transitions, adjustable sections, custom angles, etc., to provide continuous linear systems. These features shall be provided to center the lamp cavity(s) of the fixtures within the designated mounting space(s) (typically wall-to-wall).

2.03 LIGHT EMITTING DIODE (LED) FIXTURES

- A. LED fixtures shall comply with Illuminating Engineering Society (IES) LM-79 guidelines.
- B. Fixture shall have an LM-79 photometric test report from a DOE CALiPER NVLAP accredited laboratory.
- C. Fixture shall utilize components (i.e. LEDs, driver, fixture housing, etc) included in LM-79 test.
- D. Fixture shall have lumen maintenance testing with minimum test duration of 10,000 hours.
- E. Manufacturer stated end of life shall be at 70% light output. Operating life shall be no less than 50,000 hours.
- F. Color temperature, and color rendering index (CRI) shall conform to the lighting fixture schedule shown on the Drawings.
- G. Fixture power factor shall be greater than 0.9 over all input voltages.

- H. Total Harmonic Distortion (THD) shall be less than 20% over all input voltages.
- I. Fixture components shall be lead free, mercury free and RoHS compliant.

2.04 FULLY RECESSED FIXTURES

- A. Fixtures shall have thermal protection conforming to NEC and shall so be identified as thermally protected unless fixture is:
 - 1. Identified for use and installed in poured concrete, or
 - 2. Identified as suitable for installation in cavities where the thermal insulation will be in direct contact with the fixture.

2.05 LIGHT EMITTING DIODES (LEDS)

- A. LEDs shall comply with Illuminating Engineering Society (IES) LM-80 guidelines.
- B. Manufacturer stated lamp end of life shall be at 70% light output. Lamp operating life shall be no less than 50,000 hours.

2.06 DRIVER DISCONNECTING MEANS

- A. In indoor locations, luminaires that ballasts(s) or LED Driver(s) shall have a disconnecting means either internal or external to each luminaire to disconnect simultaneously from the source of supply all conductors of the ballast and LEDs/LED boards, including the grounded conductor in accordance with National Electrical Code (NEC) Article 410.

2.07 LED DRIVERS

- A. LED drivers – Non Dimming
 - 1. Input: 120-277V, 50/60Hz (100-305V with tolerances)
 - 2. Frequency: 47 - 63Hz
 - 3. Efficiency: >90% at full load at nominal working voltage
 - 4. Power Factor: >0.9 over all input voltages
 - 5. Total Harmonic Distortion: <20% overall all input voltages
 - 6. Output: Class 2 LED/55V max, Current range (adjustable) 150mA to 1,400mA
 - 7. UL recognized
 - 8. Phillips, GE, Osram, eldoLED or approved equal.
 - 9. Drivers and controls shall be compatible.
- B. LED drivers – Dimming
 - 1. Input: 120-277V, 50/60Hz (100-305V with tolerances)
 - 2. Frequency: 47 - 63Hz
 - 3. Efficiency: >90% at full load at nominal working voltage
 - 4. Power Factor: >0.9 over all input voltages
 - 5. Total Harmonic Distortion: <20% overall all input voltages
 - 6. Output: Class 2 LED/55V max, Current range (adjustable) 150mA to 1,400mA
 - 7. Flicker-free dimming down to 1% with full on/off.
 - 8. 0-10V drive compatible with both sink and current source controllers.
 - 9. UL recognized
 - 10. Phillips, GE, Osram, eldoLED or approved equal.
 - 11. Drivers and controls shall be compatible.

2.08 EMERGENCY LIGHTING DRIVER – LED

- A. Provide emergency lighting ballasts for LED fixtures with the following features:
 - 1. Shall be capable of operating at the minimum lumen output as specified on the Lighting Fixture Schedule for a minimum of 90 minutes.
 - 2. Universal input (120-277 VAC)
 - 3. Compatible with the LED fixture and driver intended for use with.

4. High-temperature long-life, nickel cadmium battery. Electronic charger with 24 hour or less recharge time.
5. Charge indicator lamp and test switch, with lamp visible, and test switch accessible, without opening fixture.
6. Equipped with self-testing/self-diagnostic circuitry.
7. UL listed.
8. When used with dimmable drivers/fixtures circuitry/programming to restore light output to specified lumens in emergency mode shall be provided.
9. Bodine BSL Series or Equal.

2.09 FIXTURE ACCESSORIES

- A. Canopies for pendant hung fixtures shall be of the ball joint type. Where more than one pendant is used per fixture, as in the case of fluorescents, a ball joint fitting shall also be provided in the fixture end of each pendant.
- B. Furnish one tamperproof screwdriver of each type of tamperproof fixture as required by fixtures specified on this project.

PART 3 - EXECUTION

3.01 GENERAL

- A. Drivers shall be installed per manufacturer's recommendations.
- B. Fixtures with integral drivers shall have the driver installed and prewired at the factory.
- C. Tandem wiring harnesses internal fixture wiring shall be factory assembled and installed in multiple fixtures which share a common ballast or driver. All wiring harnesses shall include an integral copper grounding conductor and be approved for use in air plenums.

3.02 INSTALLATION

- A. Install fixtures level, plumb and true. Align rows accurately in three dimensions.
- B. Support suspended acoustical ceiling fixtures according to the requirements of the IBC and Section 26 05 29 Hangers and Supports for Electrical Systems and 26 05 29 – Mechanical Vibration and Seismic Control as well as any local amendments.
- C. Fixture pendants, canopies, blank sections, corners, tees and other such accessories shall be finished to match their respective fixture.
- D. Refer to applicable details on architectural drawings for specific mounting requirements for all fixtures with special mounting requirements such as cove-mounted fixtures and linear fixtures.
- E. For linear fixture systems, verify fixture dimensions and mounting type with other trades prior to installation.
- F. Utility Rooms: Surface ceiling mount fixtures in rooms/areas with ceilings. In areas without ceilings pendant fixtures down to bottom of structure. In areas with mechanical equipment, ductwork and piping, pendant fixtures down to bottom of mechanical ductwork or piping as appropriate. Fixture pendants shall be rigid (threaded hangar rods) and shall be sway braced where pendants exceed 24 inches in length.
- G. Provide an unswitched circuit connection for the following:
 1. Exit signs
 2. Emergency lighting units (ELUs)
 3. Emergency fixtures
 4. Emergency night lights
 5. Fixtures with emergency LED drivers
- H. Wiring for fixtures connected to emergency circuits shall be kept entirely independent of other

wiring and equipment in accordance with NEC article 700.

- I. Clean all fixtures and lenses prior to final acceptance.

3.03 FIRE-RESISTIVE CONSTRUCTION

- A. Refer to Section 26 00 00 Electrical General Requirements.

END OF SECTION

TELECOM DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION AND GENERAL SPECIFICATIONS

- A. Provide the equipment, materials, and labor to install the systems shown on the Drawings and specified herein. This shall include (but not be limited to) provision of all trenching and backfill, raceways, sleeves, boxes, gutters, shelves, enclosures, shelf and enclosure supports, backboards, equipment racks, line and low voltage wire and cable, patch cords, pull ropes (in unused conduits), terminal modules, panels, outlets, jacks, splices, connections, cable management, labeling, testing and all other material, equipment, and labor required to the systems fully operational.
- B. The intent of this Specification is to place in working order a complete, fully tested and documented Category 6A system complying with the Codes and Standards referenced herein.

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 CATEGORY RATED PERFORMANCE LEVEL

- A. Category 6A

1.05 RELATED SECTIONS

- A. 26 05 26 - Grounding and Bonding for Electrical Systems
- B. 26 05 33 - Raceway and Boxes for Electrical Systems

1.06 COORDINATION

- A. The necessity to coordinate this work with the Serving Utility, Owner, and the Contracting Agency is emphasized. The Contractor shall be responsible for any omissions, delays and additional cost due to lack of coordination or approval from the same.
- B. Coordinate work with other contractors and trades. The layout and installation of the systems shown on the Drawings and specified herein shall be coordinated such that all special requirements for telecommunications systems shall be provided and incorporated into the project. The systems to be coordinated shall include (but are not limited to) electrical raceway, grounding, bonding, fire rated assembly, lighting, power distribution, control and instrumentation, and labeling of cables, terminations, outlets, jacks, etc. Report all conflicts to the Contracting Agency.

- C. Downtime for existing systems shall be minimized. It is the responsibility of the Contractor to plan, coordinate, and execute installation activities so that facilities are not unduly interrupted. Periods of unavoidable interruption shall be less than 4 hours in duration and be prior approved by the Contracting Agency.

1.07 CODES AND STANDARDS

- A. Where a Nationally Recognized Testing Laboratory (NRTL) listing or classification exists for a product and the product is suitable for the purpose specified and indicated, the product shall bear the appropriate marking indicating the listing or classification.
- B. Where a UL Standard is in effect, equipment shall meet that Standard and bear the UL Label.

1.08 SUBMITTALS

- A. The following shall be submitted in accordance with Section 26 00 00 - Electrical General Requirements and Division 1 in sufficient detail to show full compliance with the specification:
 - 1. Manufacturer's Catalog Data shall be submitted for the following items. Data shall include a complete list of parts, special tools, and supplies.
 - a. Copper Cable.
 - b. Information Outlets.
 - c. Patch Panels.
 - d. Equipment Racks.
 - e. Rack mounted power distribution.
 - f. Patch Cords and other accessories.
 - 2. Manufacturer's Installations Instructions.
 - 3. Labeling System: Coordinate with Contracting Agency for Owner's labeling conventions. Submit Project labeling system for approval.
 - 4. Contractor qualifications and experience as specified in this Section.
 - 5. Manufacturer's Warranty as specified elsewhere in this Section, including all warranty provisions and procedures for Owner to follow to obtain warranty service.
- B. One copy of approved submittals shall be kept at the job site.

1.09 SHOP DRAWINGS

- A. Work shall be laid out in advance. Shop drawings shall be submitted to the Contracting Agency for approval before work begins.
- B. Shop Drawings shall include dimensioned layout of Telecommunications Rooms, including backboards, patch panels, grounding terminal bus bars, ladder racking, equipment, etc. Layouts shall show lighting fixtures, HVAC equipment, etc., which affect room layouts.
- C. Shop Drawings shall include dimensioned layout of major pathways for backbone and horizontal cables, including large conduits (2 inch and larger) and sleeves.
- D. Work under this section has been indicated on the Drawings in locations that should allow installation without interfering with the work of other trades; however, exact finish locations cannot be indicated. Therefore, locations of all work and equipment shall be verified to avoid interferences, preserve headroom and keep openings and passageways clear. Review the plans for the work of the other trades and coordinate adjustment of this work, the work of the other trade or both to achieve the best installation for the Owner without additional claims or charges. Shop Drawings shall reflect coordination of work under this Section with the work of other trades.

1.10 REFERENCE CODES AND STANDARDS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only, latest edition. The reference codes and standards are minimum requirements.

Reference	Title/Revision
ANSI/IEEE C2	National Electrical Safety Code
ANSI/NFPA 70	National Electrical Code
ANSI/TIA/EIA-568.0-D	Generic Telecommunications Cabling for Customer Premises
ANSI/TIA/EIA-568.1-D	Commercial Building Telecommunications Cabling
ANSI/TIA/EIA-568-C.2	Balanced Twisted-Pair Cabling and Components Standard.
ANSI/TIA/EIA-569-C	Commercial Building Standards for Telecommunications Pathways and Spaces
ANSI/TIA/EIA-606-C	Administration Standard for Commercial Telecommunications Infrastructure
ANSI/TIA/EIA-607-C	Commercial Building Grounding and Bonding Requirements for Telecommunications
ANSI/TIA-1152-A	Testing Standards for Twisted Pair
BICSI	Telecommunications Distribution Methods Manual
ISO/IEC 11801-(1-6):2017	International Standard for Information Technology (Edition 3)
IEEE Std 1100	Recommended Practice for Powering and Grounding Sensitive Electronic Equipment (Emerald Book)
UL 1449	Transient Voltage Surge Protection
UL 1950	Standard for Information Technology Equipment, Including Electrical Business Equipment
UL 467	Grounding and Bonding Equipment
UL 497	Protectors for Paired Conductors for Communication Circuits
UL 497A	Secondary Protectors for Communication Circuits
UL 497B	Protectors for Data Communication and Fire Alarm Circuits
UL 910	Safety Test for Flame-Propagation and Smoke Density Values for Electrical and Optical- Fiber Cables

1.11 OPERATING CONDITIONS

- A. The electronic equipment designed for office environments and Telecommunications Rooms shall be rated for continuous operation under ambient environment conditions of 10 degrees C (50 degrees F), to 30 degrees C (85 degrees F) and 35 to 65 percent relative humidity, non-condensing.

1.12 QUALIFICATIONS

- A. Contractor Certification:
1. This subcontractor shall be a certified installer of the cabling system, pre-qualified by the Manufacturer for the purpose of offering the Extended System Warranty as required in this Section.
 2. Provide a signed statement indicating that the subcontractor has the ability to provide the service required by the Contract Documents using factory trained and qualified technicians for each major system type and intends to maintain that capability until the

end of the guarantee period.

- B. Contractor Experience:
1. Specialty subcontractors bidding telecommunications work shall have a minimum of five years experience in the construction, testing, and servicing of systems of the type and magnitude specified herein and shall have completed at three projects equal or larger in size than this project within the past three.
 2. Submit the required three experience projects and a list of the tools and test equipment (indicating ownership) expected to be used on this project within 30 days of award to demonstrate experience and access requirements.
 3. For each experience project submitted, provide the following information:
 - a. Project name.
 - b. Project location.
 - c. Date of completion.
 - d. Owner.
 - e. Owner's representative and phone number.
 - f. Description and dollar value of each installed system.
 - g. Name and specific responsibility of each subcontractor or employee involved with the project.
 4. For each experience project submitted, include a brief description of the system types provided and the name of the personnel directly responsible for the design (if required, and to what extent), specification, ordering, installation, programming, testing, demonstration, and overall system coordination for each of the following system types:
 - a. Telecommunications General Requirements.
 - b. Telecommunications Cable Pathway.
 - c. Telecommunications Distribution System.
 - d. Telecommunications Grounding.
 - e. Telecommunications Identification and Labeling.
 - f. Telecommunications Testing

1.13 REGULATORY REQUIREMENTS

- A. Work shall conform to the requirements of NFPA 70 and applicable local amendments.
- B. Work shall conform to the requirements of applicable Federal, State and Local Electrical and Telecommunications Regulations.

1.14 SPECIAL WARRANTY

- A. The warranty shall extend from the date of Substantial Completion to the longer of twenty (20) years or the length of the Extended Warranty offered by the successful manufacturer.
- B. The warranty shall be extended to the Owner via the manufacturer through a single point of contact and shall be fully backed by the manufacturer.
- C. The Extended Product Warranty and System Assurance Warranty for this wiring system shall be provided consisting of the following:
 1. Communications system components shall be rated for the end-to-end system performance levels on all pair combinations and warranted to support any existing or future applications which are designed to operate over a the Category rated performance levels noted in Part 2 of this specification as defined in ANSI/TIA/EIA 568.0-D.
 2. The Extended Product Warranty shall ensure against product defects, that the approved cabling components exceed the specification requirements of ANSI/TIA/EIA 568.0-D and ISO/IEC IS 11801-B, exceed the attenuation and NEXT requirements of ISO/IEC IS 11801- B for cabling links/channels, and that the installation will exceed the loss and bandwidth requirements of ISO/IEC IS 11801-B for links/channels. The warranty shall apply to passive Telecommunication Distribution System (TDS) components.
 3. The Extended Product Warranty and the System Assurance shall cover the replacement or repair of defective product(s) and labor for the replacement or repair of such defective

product(s).

- a. In the event this specialty subcontractor is unable to perform, goes out of business or ceases to exist, the manufacturer shall be responsible for identifying a new contractor to assume the warranty work.
 - b. Manufacturers shall bear full responsibility for the work of their certified installer, including applicable aspects of the design and installation.
 - c. In the event this specialty subcontractor fails to provide satisfactory warranty support, the manufacturer shall be responsible for taking the necessary remedial steps including finding a new contractor to provide warranty work.
- D. Submit a summary of warranty highlighting major features. Clearly disclose exceptions to the requirements of this document, and specifically indicate any and the provisions that could potentially void the warranty or reduce its benefit to the Owner.

1.15 MANUFACTURERS' RECOMMENDATIONS

- A. Installation procedures shall be in accordance with the recommendations of the manufacturer of the material being installed. Printed copies of these recommendations shall be submitted to the Contracting Agency 30 days prior to installation. Installation of the item shall not proceed until the recommendations are received and approved by the Contracting Agency. A copy of the recommendations shall be kept at the job site.

1.16 TERMINOLOGY

- A. ANSI/TIA 568 shall refer to the latest adopted edition of ANSI/TIA-568.
- B. The "Channel" is defined as the horizontal cabling and termination in the telecom room and workstation with the addition of patch and equipment cords at each location. The maximum patch cord length at the closet is 6 meters (20 ft.), and the maximum patch cord at the workstations is 3 meters (9.8 ft.). Channel testing must be done with the patch cords in place, and the cords cannot be removed after the testing is complete.
- C. A "Link" is defined as the horizontal cabling between the telecom room termination and workstation termination. The termination at the closet and the workstation are included as part of the Basic Link. The maximum length that the horizontal cabling can be as defined in TIA/EIA is 90 meters (295 ft.).
- D. "LP" shall refer to Limited Power cables as defined by Article 725 of NFPA 70. These cables ensure performance under high Power over Ethernet currents and can be bundled together up to 192 cables without engineering supervision of their installation.
- E. "TDS" shall refer to the Telecommunication Distribution System cabling and hardware infrastructure internal and external to a building or buildings used to transmit voice, data, and video, etc.
- F. "Stations" shall refer to individual telephone or computers, or remote peripherals of those systems (e.g., printers, computers, wireless access points (WAPs), facsimile machines, modems, etc.
- G. "Outlets" shall refer to the group of receptacles or jacks at the location where the stations connect.
- H. "Jacks" or "Ports" shall refer to the individual receptacles where phones, computers, etc. connect.
- I. "Station Cables" shall refer to the horizontal cables connecting patch panels or terminal blocks in the Telecommunications Rooms to the stations.
- J. "Pathways" shall refer to conduits, sleeves, cable-trays, distribution rings, etc., which are employed to route backbone and stations cables between equipment rooms, telecommunications rooms, stations, outlets, etc.
- K. "Backbone Cables", "Riser Cables" or "Tie Cables" shall refer to copper cables 25-pair or more and optical fiber cables 6-strand or more, connecting main cross-connect facilities, intermediate cross-connect facilities and telecommunications rooms. These cables may

include outside plant cables between buildings and riser cables between floors.

- L. "Equipment Rooms" (ER) or "Communication Equipment Rooms" (CER) shall refer to a special- purpose room that provides space and maintains a suitable operating environment for large communications and/or computer equipment. Main rooms may also be referred to as an MDF.
 - M. "Telecommunications Rooms (TR)" shall refer to a floor-serving facility for housing telecommunications equipment, cable terminations and cross-connect wiring. This is the point at which station cables terminate. It may also be referred to as an IDF.
 - N. "Terminal Blocks" shall refer to multiple punch down cable terminations.
 - O. "Patch Panels" shall refer to rack or frame mounted multiple punch down cable terminations with RJ-45 style, 8P8C jacks on the face for "plug and play" cross connect capability.
 - P. "Cable Management" shall refer to rings, troughs, gutters etc., mounted in conjunction with telecommunications distribution equipment and terminal blocks, for the orderly routing of cables, patch cords, etc.
 - Q. "LEC" shall refer to the Local Exchange Carrier providing telephone service to the facility.
- 1.17 STORAGE AND HANDLING
- A. Care shall be exercised in handling materials during construction. Damaged materials shall be repaired or replaced as directed by the Contracting Agency.

PART 2 - PRODUCTS

2.01 GENERAL CABLE AND HARDWARE CHARACTERISTICS

- A. Materials shall be as specified, first quality, manufacturer's current production.
- B. Products shall provide the standard of performance required under Section 2.2 of this specification and the Special Warranty above.
- C. Cable
 - 1. General
 - a. Horizontal telecommunication cables shall be extended between the station location and its associated TR and shall consist of 4 pair, 22, 23, or 24 gauge (as required by the Category performance rating noted below), UTP, and shall be terminated on the 8 pin modular jacks provided at each outlet. Provide cables with four FEP insulated conductor pairs (4/0 configuration).
 - b. Cables shall conform to the ANSI/TIA/EIA 568-D Commercial Building Telecommunications Cabling Standard, Horizontal Cable Section, and be part of the UL LAN Certification and Follow-up Program.
 - 2. Plenum rated – UL CMP
 - 3. UL or ETL Verified for the Category electrical performance level in noted in Part 1.
 - 4. UL Listed for Fire Safety.
 - 5. ISO 9001 Certified Manufacturer.
 - 6. Environmental:
 - a. Storage temperature: 68° F to 122° F (20° C to 50° C).
 - b. Installation Temperature: 32° F to 122° F (0° C to 50° C).
 - c. Operating Temperature: 14° F to 140° F (-10° C to 60°).
- D. Information Outlet/Jacks
 - 1. Faceplates
 - a. Configure single gang outlet information outlets in single, duplex, triplex, quad-plex, or six-plex jack arrangement, as required for the installation.
 - b. Provided blank module inserts for unused module locations.
 - c. Provide full set of color-coded snap-in icons for workstation outlets for use by Owner to mark jacks for analog and digital telephones, two unique classes of data, etc. Store icons in clear plastic bags in each TR.

- d. Refer to Specification Section 26 27 26-Wiring Devices for faceplate type/color.
- 2. Outlets/Jacks
 - a. Telecommunications jacks shall consist of multi-position 8-pin modular (8P8C) jacks, utilizing T568B termination style.
 - b. Jacks shall be manufactured by the same manufacturer as the modular patch panels.
- E. Patch panels
 - 1. Modular jack panels shall be in 24 or 48 port configurations as shown on the Drawings. Modular jack panels installations shall contain a retaining trough between every panel. Modular jack panels shall be wired for T568B configuration.
 - 2. Designation labels for each jack shall be provided for front/rear labeling of each patch panel. All cables shall be terminated in numerical sequence and labeled as to outlet number and jack position (A, B, C, D). Provide color-coded inserts ("icons") for populated jacks at patch panels and at each outlet.
- F. Patch cords
 - 1. Provide factory assembled modular patch cords for each assigned port on a patch panel. Patch cords shall conform to the requirements of ANSI/TIA/EIA 568-B Commercial Building Telecommunications Cabling Standard, Horizontal Cabling Section, and be part of the UL LAN Certification and Follow-up Program.
 - 2. Patch cords shall be manufactured by the manufacturer of the patch panels and jacks.
 - 3. Cords shall be equipped with an 8 pin modular connector on each end and the minimum length patch cord shall be provided in each instance, to make an orderly, manageable connection between the patch panels or equipment being cross-connected and/or inter connected.
 - 4. Unless shown otherwise on the Drawings at each location, provide spare patch cords of each length and type in each telecommunications room, with blue identified for data and white for voice patching.

4 foot:	1%	each blue and	1%	each white
7 foot:	2%	each blue and		each white
10 foot:	1%	each blue and		each white
15 foot:	1%	each blue and		each white

- 5. Patch cords shall be round, and consist of 24-AWG copper, stranded conductors, tightly twisted into individual pairs.
- 6. UL Listed for Fire Safety.
- 7. ISO 9001 Certified Manufacturer.
 - a. FCC Compliant.

2.02 CATEGORY RATED CABLE AND HARDWARE PERFORMANCE CHARACTERISTICS

A. Category 6A

- 1. Horizontal telecommunication cables, telecommunication outlets/jacks, telecommunication patch panels, and patch cords:
 - a. Shall meet or exceed the Channel performance defined by ANSI/TIA/EIA-568-D for a Category 6A rated system.
 - b. Shall be UL or ETL Verified for ANSI/TIA/EIA 568-D Electrical Performance for a Category 6A rated system.

2.03 CATEGORY RATED CABLE AND HARDWARE EQUIPMENT

A. CATEGORY 6A

- 1. Horizontal telecommunication cables, telecommunication outlets/jacks, telecommunication patch panels, and patch cords:

2. Performance characteristics meeting or exceeding those specified in ANSI/TIA 568 (latest adopted edition) Category 6A requirements between 1 and 500 MHz.
3. Products
 - a. Telecommunications horizontal cables
 - 1). CommScope Systimax GigaSPEED X10D (plenum or non-plenum as noted above)
 - b. Telecommunications outlet/jacks
 - 1). CommScope Systimax GigaSPEED X10D MGS600
 - c. Telecommunications patch panels
 - 1). CommScope Systimax GigaSPEED X10D PATCHMAX GS6
 - d. Telecommunications patch cords 1). CommScope Systimax

2.04 EQUIPMENT ROOMS

- A. Termination Backboards:
 1. Material: Type AC fire retardant plywood. Mount the plywood with the 'A' side exposed.
 2. Size: 3/4 inch to cover walls as shown on drawings.
 3. Manufacturer: Hoover Pyro-Guard or as approved. Special order may be required to obtain AC grade plywood.
 4. Finish: Two coats, flat latex, intumescent fire retardant paint, Flame Control Coatings No. 20-20A, or as approved. Paint plywood on two sides and four edges prior to mounting on walls.
- B. Flooring:
 1. Provide static dissipative flooring in accordance with Division 9 and Architectural Finish Schedule.
 2. Provide grounding connection to each static dissipative flooring system in two locations, in accordance with manufacturer's instructions. Grounding connections shall be homerun to the TGB or the TMGB using a #6 AWG Green THHN stranded wire.

2.05 SEISMIC BRACING

- A. Freestanding equipment racks shall be seismically braced in accordance with requirements of the IBC and as required by Section 26 05 29 - Hangers and Supports, of these Specifications. Seismic bracing shall consist of rigid supports. Cables, wires, chains or other non-rigid materials shall not be used for seismic support. Provide approved fixed equipment anchorage assemblies as published by the manufacturer. In lieu of manufacturer's published seismic bracing assemblies, the Contractor shall provide seismic installations approved by a licensed structural engineer.
- B. Approved drawings of seismic assemblies shall be made available for review by the Contracting Agency or the inspecting Authority Having Jurisdiction upon request.

2.06 FREE-STANDING EQUIPMENT RACKS

- A. Where specified, provide full height 19 inch wide NEMA standard open rack frame with the following features.
 1. Vertical cable management channels with front mounted cable management rings and top mounted cable trough. ASD preference is to have a minimum cross sectional area of 24 square inches with a 6" width preferred.
 2. Releasable hook and loop (Velcro™) cable support straps.
 3. Rack assembly shall fit within 24 inches wide by 16.5 inches floor area.
 4. Material and Finish: Steel with black powder-coat painted finish.
 5. Electrically isolated 0.125 inch by 1 inch by 60 inches chassis ground bus bar on the right rear side of the rack, bonded to the chassis with #6 braided by 6 inches long bonding jumpers.
 6. Equipment: Ortronics Mighty MO II, Hubbell NEXT FRAME series racks or as approved.

2.07 RACK MOUNTED POWER DISTRIBUTION/SURGE SUPPRESSION STRIPS

- A. Where specified or shown on drawings, provide rack mounted power distribution strips/surge suppression strips for mounting in the equipment racks furnished. The power distribution/surge suppression strips shall have the following features:
1. 120 volt input and output.
 2. Surge Energy Rating: minimum 2770 joules.
 3. EMI/RFI Noise rejection (100kHz to 10 MHz): 70.0 dB.
 4. Guarded master on/off switch preventing accidental switching.
 5. Designed to rack mount in a 19 inch equipment rack.
 6. UL 1449 Listed.
 7. UL 1449 TVSS Rating: 330V.
 8. Equipment: APC Model NET9RM, or as approved.

2.08 CABLE MANAGEMENT

- A. Backboard mounted cable management:
1. Distribution rings installed in communication rooms shall be "D" ring type. No bridle rings are permitted.
 2. Distribution rings shall be sized according the number and size of cables to be supported plus 50% spare capacity.
 3. Vertical trough-type cable management shall be minimum 6 inch wide, cable management trough, 110 Vertical Cable Management trough, or as approved.
 4. Horizontal trough-type cable management shall be minimum 3-1/2 inch wide, cable management trough, 110 Horizontal Cable Management trough, or as approved.
- B. Rack mounted cable management:
1. Distribution rings shall be sized according the number and size of cables to be supported plus 50% spare capacity.
 2. Distribution rings installed in communication rooms shall be "D" ring type. No bridle rings are permitted.
 3. Vertical trough-type cable management for use with standard 7 foot equipment rack, shall be minimum 4 inches deep.
 4. Horizontal trough-type cable management shall be 3-1/2 inch wide with horizontal and vertical routing rings, with 2 inches by 1.5 inch cutouts for through cable routing.

2.09 BUILDING ENTRANCE PROTECTION

- A. Building entrance protection terminals shall be UL listed, 100 pair building entrance protector modules with 300 to 600 volt solid state protectors in accordance with NEC 800.90 for Fuseless and Fused Protectors.
1. Protector shall have 100 Connecting Blocks.
 2. Single pair protectors shall be solid state units.
 3. Fill all modules with protectors.

2.10 UNSPECIFIED EQUIPMENT AND MATERIAL

- A. Any item of equipment or material not specifically addressed on the Drawings or in this document and required to provide a complete and functional TDS installation shall be provided in a level of quality consistent with other specified items.

PART 3 - EXECUTION

3.01 GENERAL

- A. Provide, connect and test equipment and materials for the systems herein specified and shown on the Drawings. Wiring shall be neatly tied or laced in cabinets and terminated on terminal strips provided for the purpose. Each cable shall be identified by an approved marking system at each end.
- B. Outlet/Jacks shall be identified with machine printed labels. Hand lettered labels shall not be

used.

- C. Provide labels and color-coded inserts for each jack at patch panels, in accordance with TIA/EIA- 606-C.
- D. Wherever materials, methods or placements of materials and equipment for the communications work is provided by other Subcontractors or the Owner, it shall be the responsibility of this specialty Subcontractor to coordinate that work and assure that it is provided in such a manner as to enhance the final system operation.
- E. Coordinate installation of lighting, ventilation and other systems in the communication rooms to avoid interferences.
- F. Test the systems, demonstrate operation to the Contracting Agency and provide training as specified.
- G. In each TR, IC, MDF, IDF and equipment room provide a minimum of 22 inches by 34 inches CAD developed, laminated drawing indicating floor plan and telecommunication one-line. The floor plan shall indicate telecommunication outlets with the appropriate outlet designation indicated on the plan. Include copper and optical fiber systems on this drawing.
- H. Work under this section shall be closely coordinated with work under other sections of the project.

3.02 CODES AND PERMITS

- A. Apply and pay for applicable fees, permits, and obtain serving utility and governmental approvals.
- B. Coordinate applicable work with the serving utility.
- C. Raceway fill requirements for communications systems shall be in accordance with ANSI/TIA/EIA-569-A and BICSI.
- D. NEC bending radius of communications ducts, raceways, cable trays, etc., shall be increased to not less than the installed cable manufacturer's recommendations, and the applicable ANSI and BICSI Standards.
- E. Communications work shall be in complete accordance with the following:
 - 1. National Electrical Code (NEC), latest legally enacted edition.
 - 2. Regulations of the State Fire Marshal.
 - 3. National Fire Protection Association (NFPA) Codes.
 - 4. Federal, state, county, municipal, and local codes and ordinances.

3.03 DELIVERY AND STORAGE

- A. Materials and Equipment shall be stored with protection from mechanical damage, weather, humidity and temperature variation, dirt and dust, and other contaminants.
- B. Materials shall be inspected and inventoried promptly upon receipt.
- C. Cables shall be tested immediately upon receipt and received or rejected and returned based upon testing or visual inspection.
- D. Inspection and testing shall be performed under the observation of the Contracting Agency at the Contracting Agency's option. Provide three (3) working days advance notice of tests.

3.04 LAYOUT

- A. Work shall be laid out in advance. Shop drawings shall be submitted to the Contracting Agency for approval before work begins. Maximum height for terminal blocks and patch panels shall be 6 feet-6 inches, minimum height shall be 1 foot-6 inches. Cables shall be racked and supported in a workmanlike fashion. Work shall be labeled according to ANSI/TIA/EIA 606-C, and color coded according to BICSI Standards. In the absence of details on the drawing governing the layout of terminations, the following guidelines shall apply.
 - 1. Horizontal cables from a common outlet shall terminate sequentially (in groups) on the same patch panel unless the cables are of different performance levels such as Category

- 5e and 6.
2. Horizontal cables that are of different performance levels, such as Category 5e, 6, and/or 6A, shall be terminated on different patch panels, and identified accordingly.
 3. Pairs from each cable shall be terminated sequentially from left to right, top to bottom starting with the lowest assigned number at the upper left hand corner of the frame.
 4. Riser cables shall terminate on dedicated terminal blocks, separate from but adjacent to horizontal terminal blocks. Cross-connect or patch cords longer than 18 feet shall be avoided. Install stress relief hardware where needed.
- B. Keep up to date "As-built" record drawings at each job site detailing the layout of data racks and telephone, data and trunk terminations, including a typed listing of cables/rooms served by each terminal block and patch panel. Refer to Section 26 00 00 - Electrical General Requirements for other Record Document requirements.
- C. Layout Shop Drawings shall be prepared using CAD. Final approved Shop Drawings shall be updated with precise "as-built" conditions and shall be submitted with the Operations and Maintenance Manuals. File format shall be AutoCAD "DWG" or "DXF."

3.05 CABLE INSTALLATION

- A. Cable shall be installed in conduit routed directly to Telecommunication Rooms or via conduit stubbed to cable tray. The use of so called 'j-hooks' or distribution rings will not be allowed.
- B. Conduit fill shall be limited to 40% in accordance with BICSI standards.
- C. If cable dimensions shown are exceeded, cable pathways and supports shall be resized to maintain the original fill ratios based on the dimensions shown.
- D. Follow cable manufacturer's specification regarding handling methods, retaining/support methods, bending radius and maximum pulling tension limitations.
- E. Telecommunication cables shall not be installed in the same raceway as power cables.
- F. Cables shall be installed in a neat and orderly manner and shall not cross or interlace other cables except at breakout points.
- G. Cables in vertical trays shall be individually retained with straps at a maximum of 6 feet on center.
- H. Tie wraps shall not deform the cable insulation when tightened.
- I. Cables shall be routed to minimize EMI and RFI interference. Cable shall be routed according to the following table. Spacings are minimum for Category 3 and higher cable.

Minimum Separation of Telecommunications pathways
from 480 volt or less power lines

Condition	<2 kVA	2-5 kVA	>5 kVA
Unshielded power lines or electrical equipment in proximity to telecommunications open or nonmetal pathways.	5 in	12 in	24 in
Unshielded power lines or electrical equipment in proximity to telecommunications grounded metal conduit pathways	2.5 in	6 in	12 in
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a telecommunications grounded metal conduit pathway	N/A	3 in	6 in

Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to telecommunications open or nonmetal pathways.	2.5 in	6 in	12 in
Mechanical ductwork, metal floors and other metallic planes to telecommunications open or nonmetal pathways.	2 in		
Mechanical ductwork, metal floors and other metallic planes to telecommunications open or grounded metal conduit pathways.	0 in		
Fluorescent or HID lighting fixtures	5 in	5 in	5 in

3.06 LABELING

- A. Provide machine printed labels for patch panels, cables, outlets, etc., in accordance with ANSI/TIA/EIA-606-C. Provide labeling nomenclature in accordance with information on the Drawings or Owner's labeling conventions. Submit labeling samples for review and approval.
- B. Labeling and color-coding identification for this project shall conform to TIA/EIA-606-C for a Class Administrative System.

3.07 LUBRICANT

- A. Pulling lubricant, shall be used to minimize pulling tension and prevent sheath damage when pulling cables into ducts and conduits. Lubricant shall be applied to the cable sheath with a lubricator. When pulling has been completed, the exposed cable ends shall be wiped clean of lubricant.
- B. Lubricants shall be compatible with and intended for use with plastic-sheathed cables. Soap and grease type lubricants shall not be allowed.

3.08 SEAL

- A. Ducts in which cable is placed shall be sealed with urethane foam duct seal. This material shall be inserted between the cable and the duct and in unused ducts, in order to prevent damage to the cable sheath and to prevent the entrance of dirt or water into the manhole or vault.

3.09 DISTRIBUTION RINGS AND CABLE SUPPORTS

- A. The use of so called 'j-hooks" or distribution rings will not be allowed on this Project.

3.10 TERMINATION MODULES

- A. Layout telephone and data terminal blocks as indicated on drawings with spacing as recommended by manufacturer.

3.11 GROUNDING AND BONDING

- A. Ground and bond in accordance with the requirements of Specification Section 26 05 26.

3.12 CROSS-CONNECTIONS / INTERCONNECTIONS

- A. Cross-Connections at and/or between all terminal hardware shall be provided to form a complete and functioning system.
- B. Interconnections at all terminal hardware shall be provided to form a complete and functioning system.
- C. Patch cords shall be used to make all Cross-Connections.

3.13 EQUIPMENT RACKS

- A. Equipment racks shall be seismically braced by securely bolting to the structural floor

supplemented with additional braces as required for the Seismic Zone.

1. Mount ground bars on insulating bushed standoffs.
2. Connect Wiremold to power outlets.
3. Electrically separate open racks with insulating washers and nonconductive screws.
4. Electrically separate enclosed racks with insulating washers and nonconductive screws.

3.14 TERMINATIONS

- A. Cables shall be marked with wire markers at both ends, and terminals on terminal blocks or patch panels shall bear the cable number. Riser cables shall be neatly marked with "From-To" information.
- B. Wire twist shall be maintained to within 0.25 inch of the termination.

3.15 TERMINATION MODULES

- A. Install per manufacturer's recommendations.
- B. Protection modules shall conform to NEC 800-30 and be installed per manufacturer's recommendations.

3.16 COMPLETION AND TESTING

- A. Telecommunications System test reports shall be submitted to and approved by the Contracting Agency. The test reports shall certify that the Telecommunications Distribution System is complete, passes all test criteria, is fully operational, and that all work has been witnessed as specified.
- B. After installation and test of each system is complete, each system and the entire system shall be demonstrated and tested for proper operation. The Contractor shall schedule a demonstration with the following representatives present:
 1. Contractor's representative.
 2. Manufacturer's representative for each major communications subsystem.
 3. Contracting Agency's representative.
- C. Provide all forms, instrumentation and test equipment, loads, and other consumables required to demonstrate the systems to the Contracting Agency's satisfaction.
- D. Incoming Inspection Tests:
 1. Inspect all materials for damage.
- E. Patch Cord Testing:
 1. All patch cords shall be tested and shown to comply with the applicable Category cord requirements of TIA/EIA-568B.
 2. Compliance shall be proven by testing patch cords alone (i.e., not by inserting the patch cords into a channel).
 3. Cord performance shall be measured on-site by either using either the TIA method delineated in Annex J or by using a cord-test adapter and a hand-held LAN cable tester. Cord compliance may be demonstrated by actual test reports supplied by the patch cord manufacturer.
- F. Final Inspection Tests:
 1. Testing of all copper wiring shall be performed prior to system acceptance. 100 percent of the horizontal and riser wiring pairs shall be tested. Link testing of all copper cabling shall be performed. Complete, end to end test results shall be submitted to the Contracting Agency.
 - a. Category 6A cable runs shall be tested for conformance to the specifications of EIA/TIA 568-B.2, Category 6A. Testing shall be done with a ANSI/TIA/EIA 568-B ETL verified Level II-E test set, with accuracy per Proposed TIA Level III standards.
 - 1). Test shall include all requirements of ANSI/TIA/EIA 568-B, including wiremap, length, characteristic impedance, insertion loss, ambient and impulse noise, NEXT, PSNEXT, FEXT, ELFEXT, PSELFEXT, return loss, ACR, PSACR,

- Propagation Delay and Delay Skew.
- 2). Supported test frequency shall be 1-350 MHz to provide re-certification capability beyond Category 6 requirements.
 - 3). Any cables not meeting the requirements of the standard shall be brought into compliance at no charge to the Owner.
2. Test all cable with an approved cable tester in the presence of the Contracting Agency, at the Contracting Agency's option. Provide three (3) working days advance notice of tests. Record cable numbers on data test reports. Submit reports to Contracting Agency.
 3. Test all cables from both ends.
 4. Re-test all cable disturbed after testing, at the direction of Contracting Agency.
 5. Spare unterminated cable shall be temporarily terminated for testing.
- G. Replace all rejected materials.
- H. Test AC grounds and voltages in equipment racks.
1. Record voltage at equipment rack power source both at no load and at 15 Amp resistive load.

3.17 OPERATING AND MAINTENANCE MANUALS

- A. Prepare manuals describing the servicing and maintenance requirements for the equipment being provided as required in this Section of these specifications.
- B. Information contained in the manuals shall consist of catalog data on each item, together with parts lists, wiring diagrams, test reports, description of routine maintenance required, suggested frequency of maintenance and recommended practices, and shall be 8-1/2 inches by 11 inches in size. Catalog pages and data in manuals shall be neat, clean copies. Drawings shall be accordion folded to above size. An index shall be provided which shall list all contents in an orderly manner. Include corrected shop drawings in the maintenance manuals. Each copy of the instruction manual shall be adequately labeled for identification and shall include plastic tabs coordinated with the index.
- C. Provide "Step-by-step" instructions for interpreting and utilizing the cable, outlet, jack and equipment identification system, including instruction for use of jack icons.
- D. Refer to "Submittals" requirements of this Section for additional O&M requirements.

END OF SECTION

FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This specification provides the requirements for the installation, programming, and configuration of a complete Addressable Intelligent Life Safety System Network for this project. The system shall include, but not limited to: Fire Alarm Control Panel(s), Automatic and Manually Activated Voice Evacuation Alarm Subsystem with Firefighter Telephone Communications, Automatic and Manually activated alarm Initiating and Indicating Peripheral Devices and Appliances, conduit, wire, and accessories required to furnish a complete and operational Life Safety System.
- B. The system drawings show the intended coverage and suggested device locations. Final device quantity, location, and AHJ approval are the responsibility of the contractor.

1.02 NOTIFICATION OF POTENTIAL HAZARDS

- A. Asbestos, lead and other potentially hazardous materials are present in the building that may impact the work of all trades. Regulated air contaminants, including asbestos and lead are also present in the settled and concealed dust in and on architectural, structural, mechanical and electrical components or systems throughout the building. All trades shall coordinate with other trades and conduct their work to prevent worker exposure or site contamination. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of these materials and the installation of new materials or components. This notification is provided in accordance with the EPA and OSHA requirements.

1.03 NOTIFICATION OF CHILD OCCUPIED FACILITY

- A. Portions of this building are classified as a Child Occupied Facility in accordance with 40 CFR 745 and lead-based paints may be present on components to be disturbed in those areas. Personnel performing work in these areas must comply with the requirements of 40 CFR 745, including training, work practices and cleaning of the work area. Refer to Specification Divisions 0, 1 and 2 for specific information concerning disturbing, removing and disposing of lead materials and the installation of new materials or components. This notification is provided in accordance with EPA and OSHA requirements.

1.04 SCOPE

- A. Provide in operating condition an electrically operated, electrically supervised digital multiplexed fire alarm system as described herein. The system shall include, but not be limited to, control unit, power supplies, alarm initiating and indicating devices, conduit, conductors, fittings and accessories required to provide a complete operating system. Units shall be located in accordance with plans.
- B. Provide all related demolition in support of the project. Refer to the Plans and Section 26 0000- 3.015- Electrical General Requirements for additional requirements and information.

1.05 DEFINITIONS

- A. Contractor: Within this section of the specifications, "Contractor" shall mean the Contractor performing this portion of the work.
- B. Provide: Within this section of the specifications, "provide" shall mean to furnish and install.
- C. AHJ – Authority Having Jurisdiction

1.06 REFERENCES

- A. The equipment and installation shall comply with the current provisions of the following Codes and Standards:
 - 1. National Electric Code, Article 760.
 - 2. National Fire Protection Association Standards:
 - NFPA 72
 - National Fire Alarm Code

NFPA 101 Life Safety Code
 NFPA 99 Health Care Facilities Code

- 3. Local and State Building Codes.
 - 4. Local Authorities Having Jurisdiction.
 - 5. Underwriters Laboratories Inc.
- B. The system and components shall be listed by Underwriters Laboratories Inc. for use in fire protective signaling system under the following standards as applicable:

UL 864/UOJZ, APOU	Control Units for Fire Protective Signaling Systems.
UL 268	Smoke Detectors for Fire Protective Signaling Systems.
UL 268A	Smoke Detectors for Duct Applications.
UL 217	Smoke Detectors Single Station.
UL 521	Heat Detectors for Fire Protective Signaling Systems.
UL 228	Door Holders for Fire Protective Signaling Systems.
UL 464	Audible Signaling Appliances.
UL 1638	Visual Signaling Appliances.
UL 38	Manually Activated Signaling Boxes.
UL 346	Waterflow Indicators for Fire Protective Signaling Systems.
UL 1971	Standard for Signaling Devices for the Hearing Impaired.
UL 1481	Power Supplies for Fire Protective Signaling Systems.
UL 1711	Amplifiers for Fire Protective Signaling Systems.
UUKL	Smoke Control Equipment

- C. Americans with Disabilities Act (ADA).
- D. International Standards Organization (ISO).
 - 1. ISO-9000.
 - 2. ISO-9001.

1.07 RELATED WORK

- A. Duct smoke detectors shall be furnished, wired and connected by the electrical contractor.
- B. Elevator recall control circuits to be provided by the electrical contractor.
- C. Kitchen hood extinguishing systems status monitoring.

1.08 SYSTEM DESCRIPTION

- A. The Fire Alarm / Life Safety System supplied under this specification shall be a microprocessor based networked system. Control Panel Assemblies and connected Field Appliances shall be provided by the same company and shall be tested and cross listed as compatible to ensure that a fully functioning Life Safety System is provided. The system shall be capable of supporting the functions required by fire alarm, mass notification.
- B. Addressable smoke detector sensitivity settings for both pre-alarm and alarm activation shall be automatically individually configurable for both daytime and nighttime operation. Addressable smoke detectors shall be UL listed for automatic sensitivity testing.

1.09 QUALITY ASSURANCE

- A. Qualifications of Supplier
 - 1. The system supplier shall have a minimum of 10 years of experience in distribution and service of the proposed equipment brand.
 - 2. The supplier shall have in-house engineering and project management capability consistent with the requirements of this project. The project shall be supervised by personnel certified by NICET as fire alarm Level IV technicians.
 - 3. The supplier shall employ qualified and manufacturer certified system designers to perform the detailed engineering design, system calculations, for all the system equipment and programming.
 - 4. The supplier shall produce all panel and equipment drawings, submittals, and operating manuals, as detailed elsewhere in this specification.
 - 5. The supplier shall be responsible for providing qualified on site representative(s) for coordination of system installation, and final system testing and commissioning in accordance with these specifications.
- B. Qualifications of Contractor
 - 1. The contractor shall have successfully installed similar system fire detection, evacuation and visual signaling control components on a previous project of comparable size and complexity. The Contracting Agency reserves the right to reject any control components for which evidence of a successful prior installation performed by the Contractor cannot be provided.
 - 2. The Contractor shall have in house engineering and project management capability consistent with the requirements of this project. Qualified and approved representatives of the system manufacturer shall:
 - a. Perform the detailed engineering design of central and remote control equipment.
 - b. Produce panel and equipment drawings and submittals, and operating manuals.
 - c. Coordinate system installation requirements, and final system testing and commissioning in accordance with these specifications.
 - 3. The installation of the system shall conform to State of Alaska regulations.
 - 4. The Manufacturer shall be a nationally recognized company specializing in fire alarm systems and shall employ factory trained, NICET certified technicians. The Manufacturer shall maintain a service organization in Alaska and have a minimum of 5 years of experience in the fire alarm industry.
 - 5. The installer shall be a company specializing in the installation of fire alarm systems and be factory certified by the Manufacturer for their system. The installer shall have a minimum of 3 years of experience installing fire alarm systems. The installation shall be fully field verified by a factory trained and authorized technician and hold a NICET Level III certification.

1.10 SUBMITTALS

- A. Provide submittals for products in accordance with Section 26 0000 - Electrical General Requirements and Division 1.
- B. Submit for approval manufacturer's catalog information with complete description of panel mounted and remote equipment.
- C. Include complete one-line risers and point-to-point wiring diagrams prepared especially for this installation.
- D. The supplier of the system shall provide conduit layout drawings of the system, indicating type, size and number of all conductors, conduits and junction boxes.
- E. Provide calculations verifying standby battery capacity per NFPA 72, including manufacturer's published current consumption data for equipment on the System.
- F. Provide calculations verifying that notification appliance circuits voltage drops do not exceed the limits further specified in this Section.
- G. Provide calculations verifying that audio amplifier circuits are sized in accordance with this

Section.

- H. DELETE SUPERFLUOUS INFORMATION FROM SUBMITTAL DATA, SUCH AS MODEL NUMBERS AND OPTIONS FOR EQUIPMENT CONTAINED ON MANUFACTURER'S DATA SHEETS BUT NOT USED ON THIS PROJECT.
- I. Submit to the Authority Having Jurisdiction and obtain a written statement of Approval of the proposed system. This Approval shall be obtained prior to submitting to the Contracting Agency.

1.11 OWNER'S MANUALS

- A. Furnish complete sets of Operation and Maintenance Manuals and other information necessary for the operation and maintenance of the system in accordance with Division 1 requirements. Provide number of sets as required in Division 1, however if not specified, provide a minimum of two (2) complete sets.

1.12 WARRANTY AND SERVICE

- A. Warrant all components, parts and assemblies against defects in materials and workmanship for a period of 12 months from date of final completion. Warranty service shall be provided by a trained specialist of the equipment manufacturer. The specialist shall be based in a fully-staffed branch office located within a reasonable distance from the job site.
- B. Service availability: The supplier shall have sufficient stock on hand and have a fully equipped service organization capable of guaranteeing response time within 2 hours of service calls, 24 hours a day, 7 days a week to service completed systems.
- C. The Engineered Systems Distributor of the Fire Alarm / Life Safety Equipment specified herein shall provide a copy of their certificate of successful completion of an authorized Training Course given by the Manufacturer of the Fire Alarm / Life Safety Equipment.

1.13 UNIT PRICING

- A. The Contractor shall include in his bid a unit price for the following items. Unit price shall reflect a fully installed and operating price, including devices, boxes, conduit, wire, programming, testing, etc., without limitation.
 - 1. Intelligent Photoelectric Smoke Detector.
 - 2. Intelligent Fixed Temperature Heat Detector.
 - 3. Intelligent Fixed Temperature/Rate of Rise Heat Detector.
 - 4. Intelligent Photoelectric/Heat Multisensor Smoke Detector.
 - 5. Intelligent Ionization/Photoelectric/Heat Multisensor Smoke Detector.
 - 6. Monitor Module.
 - 7. Waterflow/Tamper Module.
 - 8. Universal Module.
 - 9. Control Relay Module.
 - 10. Intelligent Manual Fire Alarm Box.
 - 11. Intelligent Duct-Mounted Photoelectric Smoke Detector.
 - 12. Strobe.
 - 13. Horn/Strobe.
 - 14. Speaker/Strobe.
 - 15. Analog Addressable Loop Circuit in Conduit (EMT) (Cost/FT) PART 2 - PRODUCTS

2.01 BASIS OF DESIGN

- A. These specifications are based on equipment from Edwards System Technology (EST4) to set a standard for design and quality. No other manufacturers are acceptable.

2.02 GENERAL

- A. Equipment furnished for this project shall be new and unused. Components and systems shall be designed for uninterrupted duty. Equipment, materials, accessories, devices, and other facilities covered by this specification or noted on contract drawings and installation specifications shall be suited for the intended use and shall be provided by a single

manufacturer. If the equipment provided under this Specification is provided by different manufacturers, then that equipment shall be recognized as compatible by both manufacturers, and "Listed" as such by Underwriters' Laboratories.

- B. System installation and operations shall be verified by the manufacturer's representative and a verification certificate presented upon completion. The manufacturer's representative shall be responsible for an on-site demonstration of the operation of the system and initial staff training as required by the Contracting Agency.
- C. The system shall be capable of detecting the electrical location of each Signature intelligent device including new and existing devices. It shall be possible to display the intelligent device map on the laptop PC.
- D. It shall be possible for authorized service personnel using a Program/Service Tool or laptop PC to change the personality/function of a Signature Series Device to meet changes in building layout or environment. System changes shall be verified by the manufacturer's representative and a verification certificate presented upon completion.

2.03 AUTOMATIC ALARM OPERATIONS

- A. Operation of each alarm input device shall show on the LCD display at each Control Panel and the Remote Alphanumeric Display Annunciator(s). Each Intelligent device shall annunciate individually
- B. LCD display messages and Graphic Annunciator layout shall be approved by the Authority Having Jurisdiction and the Owner prior to equipment ordering and programming. Changes required by the AHJ or the Owner shall be implemented without increase in the Contract Amount.
- C. The system shall be capable of displaying events by type (fire alarm, pre-alert, supervisory, and trouble). At the same time, the system shall sound a momentary audible signal for each event occurrence; flash an LED when an unacknowledged event exists, and, update the display to annunciate the total by type.
- D. Upon alarm, the system shall sound the evacuation signals throughout the building.
- E. The system shall display operational status of each signal circuit to inform the emergency user of the system status.
- F. Upon alarm, the system shall shut down air supply fans. Shutdowns shall be hardwired from the Fire Alarm System (i.e., not implemented via building automation controls) and immediate acting and shall not be overridden by Hand-Off-Auto switches or other controls.
- G. Upon alarm, the system shall de-energize door holders to release fire doors. Provide separate circuit(s) as necessary for operation of all door holders. If door holders are 24V, circuits shall be from the fire alarm control panel using 120VAC to 24VAC transformers. Door holder circuits shall be fused as necessary to prevent damage to the Fire Alarm System. Submit for approval all proposed power sources prior to installation or connection of equipment.
- H. Overhead Doors: Provide local release only for overhead doors or release upon general alarm as noted on drawings.
- I. Upon alarm initiated by the sprinkler flow switch(es), the system shall sound the exterior sprinkler bell and sound the evacuation signals throughout the building. The sprinkler bell shall be supplied by a non-silence able supervised notification circuit.
- J. Upon alarm, the system shall de-energize smoke dampers and smoke/fire dampers to close dampers.
- K. Detectors for operation of fire/smoke dampers in elevator shafts without sprinkler protection shall generate an alarm condition and cause operation of the associated damper, but shall not generate a general building alarm. Detectors associated with other smoke/fire dampers shall generate a general building alarm.
- L. Separate Alarm and trouble conditions shall be transmitted to the Building Automation System (BAS) and Building Security System. Common alarm, common trouble and common sprinkler

alarm conditions shall be monitored by the BAS and Security Systems. Provide separate sets of outputs for the BAS and Security Panels.

2.04 ELEVATOR RECALL

- A. The activation of a smoke sensor or detector in any elevator machine room or associated lobby (other than on the Designated Level) shall cause the car(s) that serve that lobby to return nonstop to the Designated Level. If the smoke sensor or detector at the Designated Level is activated the car(s) shall return to an Alternate Level approved by the enforcing authority. (ANSI/ASME A17.1 RULE 211.3b.). Unless otherwise required by the Authority Having Jurisdiction, only the elevator lobby, elevator hoistway (if provided), and the elevator machine room smoke detectors shall initiate elevator recall for fire fighter's service.
- B. The activation of elevator hoistway (if provided) and elevator machine room smoke detectors shall cause separate and distinct visible annunciation at the control unit and required annunciators to alert fire fighters and other emergency personnel that the elevators are no longer safe to use.
- C. Elevator Control Circuits:
 - 1. Provide three separate elevator control relay circuits for each elevator(s). The elevator control circuits shall be terminated at their respective elevator controller in the elevator machine room(s). Operation of the elevators shall be in accordance with ANSI/ASME A17.1, Safety Code for Elevators and Escalators, Rules 211.3 through 211.8. Smoke detectors shall activate the three elevator control circuits as follows:
 - a. Control Circuit #1: Activation of the smoke detector at the Designated Level (designated elevator recall lobby) shall actuate the first elevator control circuit. If the elevator is equipped with front and rear doors, the smoke detectors in both lobbies at the designated level shall actuate Control Circuit #1.
 - b. Control Circuit #2: Activation of the smoke detectors in the remaining elevator lobbies shall actuate the second elevator control circuit.
 - c. Control Circuit #3: Activation of smoke detectors in elevator machine room(s) shall actuate the third elevator control circuit. Where the elevator machine room is located at the Designated Level, the elevator machine room smoke detector shall also actuate Control Circuit #1.

2.05 EQUIPMENT

- A. The Life Safety System shall be a Multi-Processor Based Networked System designed specifically for Fire and Audio Evacuation applications. The Life Safety System shall be UL listed under Standards 864 (Control Units for Fire-Protective Signaling Systems) under categories UOJZ and APOU, and ULC listed under standard CAN/ULC-S527.
- B. The Life Safety System shall include all required hardware and system programming to provide a complete and operational system, capable of providing the protected premises with the following functions and operations:
 - 1. Modular systems design, with a layered application design concept, including an "Operational Layer" and a "Human Interface Layer," to allow maximum flexibility of the system with a minimum physical size requirement.
 - 2. System response to any alarm condition shall occur within 3 seconds, regardless of the size and the complexity of the installed system.
 - 3. System Common Control Functions shall be automatically routed to any node of the system as a function of the time of day and date.

2.06 THE LIFE SAFETY SYSTEM

- A. The Life Safety System shall include the following features and shall support the following operations in each installed cabinet or node of the system:
 - 1. Multi-Priority, token passing, peer-to-peer network connection of up to 64 system nodes wired as Network configuration support for Class A

2. Ground fault detection by panel, by Signature Data Circuit, and by device module.
 3. Ability to download all system applications programs and "firmware" from a computer through a single point in the system.
 4. True Distributed Intelligence, including microprocessor-based Detectors and Modules.
 5. A.C. Power Trouble Delay adjustable from 4 Hours to 10 Hours.
 6. Removable, Interlocked terminal blocks for the connection of the field wiring to the Fire Alarm Control Panel.
 7. Electronic Addressing of Field Devices.
 8. Advanced Power Management.
 9. Dead Front Construction.
- B. System Common Controls and Emergency User Interface: The Fire Alarm / Life Safety System shall include a Emergency Operators' Interface Panel which shall include the following system annunciation and control functions:
1. System Annunciation and Control Functions:
 - a. Hands free Emergency Operation. The first and last highest priority event on the system shall be displayed automatically and simultaneously.
 - b. Control Panel Internal Audible Signal shall have four programmable signal patterns, to allow for the easy differentiation between Alarm, Supervisory, Trouble and Monitor conditions within the installed system.
 2. Discrete "System Status" LEDs:
 - a. Power Status LED - Green LED shall illuminate when AC power is present.
 - b. Test Status LED - Yellow LED shall illuminate when any portion of the system is in the test mode. A programmable timer shall cause the system to automatically exit the test mode after a period of system inactivity. This Test LED shall function in a local or in a group mode.
 - c. CPU Fail Status LED - Yellow LED shall illuminate when the panel controller has an internal failure.
 - d. Ground Fault Status LED - Yellow LED shall illuminate when ungrounded wiring connected to the cabinets' power supply has continuity to ground. This feature shall function in either a local or group mode.
 - e. Disable Status LED - Yellow LED shall illuminate whenever any point or zone in the installed system is manually disabled.
 3. Discrete Common Control Switches with associated Status LEDs:
 - a. Reset: Depression of the Reset Switch shall start the system reset operation. The associated Yellow LED shall have three flash rates during this operation to inform the user of the progress status of the reset cycle. The LED shall flash fast during the smoke detector power down sequence, then it shall flash slowly during the restart phase, and shall illuminate steadily for the restoral phase. The LED shall go out completely when the system is back to normal mode. Each phase, as well the overall reset cycle shall be programmable to perform other functions.
 - b. Alarm Silence: Depression of the Alarm Silence Switch shall turn off all (audible and/or visible) Notification Appliance Circuits. The associated yellow LED illuminates when the Alarm Silence function is active, whether by the Alarm Silence Switch, or by an integral software timer. Subsequent activation of the Alarm Silence Switch shall resound the signals. Activation of the Alarm Silence switch shall be programmable to perform other functions.
 - c. Panel Silence: Depression of the Panel Silence Switch shall turn off the systems' internal audible signal when configured as a 'local' system. The associated yellow LED illuminates when the panel silence feature is activated.
 - d. Drill Switch / LED: Depressing the DRILL switch activates the fire drill function. Yellow LED indicates that the fire drill function is active. The Drill Switch shall also be programmable to perform system functions other than the Drill Function.
 4. The LCD display shall provide a minimum of 10 separate event queues to minimize operator confusion by automatically categorizing event types, the queues shall include

but not be limited to Alarm, Emergency, Supervisory, Disables/Bypasses/Test, Ground Fault, Monitor, and FirePhone call in.

- a. Receipt of alarm, trouble, and supervisory signals shall activate integral audible devices at the control panel(s) and at each remote annunciation device.
 - b. The LCD display shall contain the following system switch/indicators. Each common control switch shall be tactile in nature and shall not be part of the touch screen display area. The switches shall be prominent from the display face allowing ease of operation, be provided with color coded ring as described below and be local language/dialect adaptable. Confirmation of user switch activation shall be provided by illumination of the accompanying indicator. The switches shall support customization by individual LCD location on the project. Switch designation and operation shall be as per the plans or shall be as follows:
 - c. Panel Silence Switch with black color coding and visual indicator
 - d. System Alarm Silence Switch with red color coding and visual indicator
 - e. System Reset Switch with green color coding and visual indicator
 - f. The LCD display shall contain the following project display items:
 - g. The date shall be selectable as to the displayed order of its elements and shall be displayed as MM/DD/YYYY
 - h. The LCD shall have bldg. address on main screen without any vendor supplier information on display.
 - i. Events displayed on the LCD shall show the event type with time stamp and text describing the location of the device.
 5. Test: The system shall allow the authorized operator to perform test functions within the installed system. Test functions shall be defined by the authorized operator to be performed on a per cabinet, circuit, or service group basis.
- C. Local Control and Display Annunciators:
1. Each panel in the installed system shall include local Control and Display Annunciators. These annunciators shall have integral membrane style, tactile push-button control switches, for the control of system functions, and LEDs with programmable (software-controlled) flash rates and slide-in labels for annunciation of system events.
- D. Remote System Display (Point) Annunciators:
1. Each remote display annunciator panel in the installed system shall include remote Control and Display Annunciators. These annunciators shall have integral membrane style, tactile push-button control switches for the control of system functions, and LEDs with programmable (software-controlled) flash rates and slide-in labels for annunciation of system events. Coordinate specific control functions to be provided at each display annunciator with Contracting Agency.

2.07 SIGNALING LINE CIRCUITS:

- A. The signaling line circuit connecting panels/nodes to intelligent addressable devices including, detectors, monitor modules, control modules, isolation modules and notification circuit modules shall be Class B All signaling line circuits shall be supervised and power limited.
- B. When the addressable devices on a signaling line circuit cover more than one designated fire/smoke compartment, a wire-to-wire short on the circuit shall not affect the operation of the addressable devices in other fire/smoke compartments.
- C. Each SLC shall support 125 addressable detector addresses and 125 module addresses. The SLC shall support 100% of all addressable devices in alarm and provide support for a 100% compliment of detector isolator bases. Initial circuit loading shall not exceed 80% in order to allow for future system expansion.
- D. T-taps (branching) shall be permitted on Class B circuits. Where possible, the devices installed at the end of each branch should be easily accessible for troubleshooting, e.g. a pull station at normal mounting height. The system shall support Class B T-taps (branching) from Class A risers.

- E. The addressable device SLC module shall be UL Listed for use with code compliant, electrically sound existing wiring.
- F. Each intelligent addressable device shall transmit information about its location with respect to other devices on the circuit. This information shall be used to create an "As-Built" wiring diagram as well as provide enhanced supervision of a device's physical location. The device message and programmed system output function shall be associated with the device's location on the SLC circuit location and not a device address.
- G. The SLC module shall allow replacement of "same type" devices without the need to address and reload the "location" parameters on replacement devices.
- H. The SLC/Panels shall notify the user when un-programmed devices are detected on the SLC circuit. The SLC/Panels shall notify the user when the wrong device type is installed at a location configured for a different device type on the SLC circuit.
- I. Should an SLC Controller CPU fail to communicate, the SLC circuit shall go into the stand-alone mode. The circuit shall be capable of producing a loop alarm if an alarm type device becomes active during stand-alone mode to enhance system integrity.

2.08 AUDIO AMPLIFIERS

- A. Provide emergency audio as part of the main fire alarm control panel. The emergency audio shall contain a paging microphone and zoned amplifiers capable of delivering multi-channel audio messages. The system shall support a minimum of 100 audio channels. Transmission of live paging audio shall be over the same data network cabling as the fire panel data. The network data transmission shall be over a dedicated single copper pair, or one single mode fiber, or category 6A cabling to remote parts of the facility. Pre-recorded messages shall be stored locally at each panel.
- B. The audio system zoned amplifiers must be able to operate 25 VRMS or 70 VRMS speakers and be power limited and protected from short circuit conditions on the audio circuit. The amplifier output must be power limited and wired in a Class B configuration. The amplifiers shall source pre-recorded messages locally and shall not have to rely on network communications to receive pre-recorded messaging. Should local audio be unavailable the amplifiers shall provide an integral backup 1000 Hz temporal (3-3-3) tone generator evacuation notification and 20PPM for alert notification which shall operate in the event primary audio signals are lost and the amplifier is instructed to broadcast alarm information.
- C. Provide a standby audio amplifier that shall automatically sense the failure of a primary amplifier, and automatically program themselves to select and de-multiplex the same audio information channel of the failed primary amplifier, and fully replace the function of the failed amplifier.>
- D. Provide as minimum, one twenty (20) watt audio amplifier per paging zone. Initial amplifier loading shall not exceed 80% in order to allow for future system expansion. Calculations shall assume each speaker is connected at one (1) watt.
- E. Audio amplifiers shall be EDWARDS 3-ZA series.

2.09 OFF PREMISES COMMUNICATIONS

- A. DACT
 - 1. The system shall provide off-premises communications capability using a Digital Alarm Communications Transmitter (DACT) for sending system events to multiple Central Monitoring Station (CMS) receivers.
 - 2. The dialer shall support up to 255 individual accounts and to send account information to eight (8) different receivers, each having a primary and secondary telephone access number. System events shall be capable of being directed to one or more receivers depending on event type or location as specified by the system design.
 - 3. IP configuration shall support encrypted communications.
 - 4. IP service shall support static addressing as well as DHCP and DNS server connectivity.
 - 5. IP configuration shall support, single and dual path communications.

6. IP service shall provide 128 bit AES Advanced Encryption Standard "FIPS PUB 197".
7. The IP service shall provide a physical connection to the building network infrastructure via any one of the following mediums, CAT 5e cable, Single Mode Fiber, or Multimode Fiber.
8. The system shall provide the CMS(s) with point identification of system events using Contact ID protocols.
9. The owner shall arrange for a physical connection to the building IP infrastructure and needed IP configuration data including but not limited to DHCP server detail or static IP address with subnet mask, Default gateway, DNS server addresses, and port number.
10. The system shall provide off premises communications capability using a cellular Digital Alarm Communications Transmitter (Cell/DACT) for sending system events to multiple Central Monitoring Station (CMS) receivers over a Cellular network.
11. Any cellular communication hardware used for this purpose shall be UL listed and compatibility listed for use with the fire panel. Third party cellular equipment is acceptable but generic compatibility statements are not acceptable, only devices shown in the panels UL controlled compatibility list shall be accepted. All devices must transmit point to point (Contact ID) to CMS receivers.

2.10 REMOTE BOOSTER POWER SUPPLY

- A. Remote booster power supplies shall provide four (4) synchronized Class B or two (2) Class A, supervised and power limited, 24VDC filtered and regulated Notification Appliance Circuits (NACs). Each NAC output shall be configurable as a continuous 24Vdc auxiliary power output circuit. The booster power supply shall be capable of a total output of 10 amps.
- B. The power supply NACs shall be configurable to operate independently at any one of the following rates: continuous synchronized, or 3-3-3 temporal. It shall be possible to configure the NACs to follow the main FACP NAC or activate from intelligent addressable synchronized modules. All visible & audible NACs within the facility shall be synchronized.
- C. The remote booster power supply shall be capable of recharging up to 24AH batteries to 70% capacity in 24 hours maximum. Batteries provided shall be sized to meet the same power supply performance requirements as the main FACP, as detailed elsewhere in this specification.
- D. All AC power connections shall be to the building's designated dedicated emergency electrical power circuit. The power circuit disconnect means shall be clearly labeled FIRE ALARM CIRCUIT CONTROL and shall have a red marking. The location of the circuit disconnect shall be labeled permanently inside each remote NAC power supply the disconnect serves.
- E. The remote NAC power supplies shall be EDWARDS model BPS/APS series.

2.11 INTELLIGENT DETECTORS

- A. Each detector shall contain an integral microprocessor which shall determine if the device is normal, in alarm, or has an internal trouble. The microprocessor's non-volatile memory shall permanently store the detector's serial number, device type and system address. It shall be possible to address each intelligent device without the use of switches. Devices requiring switches for addressing shall not be considered as equal. Memory shall automatically be updated with the hours of operation, last maintenance date, number of alarms and troubles, time of last alarm, and analog signal patterns for each sensing element just before the last alarm.
- B. Each detector shall be capable of identifying up to 32 diagnostic codes. This information shall be available for system maintenance. The diagnostic code shall be stored at the detector.
- C. Each addressable detector on the Signaling Line Circuit (SLC) shall transmit information regarding its location with respect to other intelligent devices on the signaling line circuit to the control panel, creating an "As-Built" circuit map. The circuit mapping function shall provide location supervision of all intelligent devices on the signaling line circuit. An intelligent detector's programmed system response functions shall be associated with the detector's

actual location on the signaling line circuit and not with the detector's address. After system commissioning, detectors improperly installed in the wrong location shall function according to the mapped programmed response for its location on the circuit, not its detector's address.

- D. The system shall allow for changing of detector types for service replacement purposes without the need to reprogram the system. The replacement detector type shall automatically continue to operate with the same programmed sensitivity levels and functions as the detector it replaced, without the need for reprogramming. System shall display an off-normal condition until the proper detector type is installed or a change in the device type profile has been made.
- E. Detectors with addressing components in the base shall not be considered as equal. Each Signature Series device shall be capable of automatic electronic addressing and/or custom addressing without the use of DIP or rotary switches. Devices using DIP or rotary switches for addressing, either in the base or on the detector shall not be acceptable.
- F. The intelligent Analog detectors shall be suitable for mounting on any Signature Series detector- mounting base.
 - 1. Fixed Heat Detector
 - a. Provide intelligent fixed temperature heat detectors at the locations shown on the drawings.
 - b. The detector shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm. The detector shall utilize a low mass thermistor heat sensor and operate at a nominal fixed temperature alarm point rating of 135oF (57oC). The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of thermistor data. Systems using central intelligence for alarm decisions shall not be considered as equal.
 - c. The heat detector shall be rated for ceiling installation at a minimum of 50 ft (15.24m) centers and also be suitable for wall mount applications.
 - d. The Intelligent fixed temperature detector shall be an EDWARDS SIGA-HFD.
 - 2. Fixed Heat Detector with Dual Reporting
 - a. Provide intelligent fixed temperature heat detectors at the locations shown on the drawings.
 - b. The detector shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm. The detector shall utilize a low mass thermistor heat sensor and operate at a nominal fixed temperature alarm point rating of 135oF (57oC). The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of thermistor data. Systems using central intelligence for alarm decisions shall not be considered as equal.
 - c. The heat detector shall be rated for ceiling installation at a minimum of 50 ft (15.24m) centers and also be suitable for wall mount applications.
 - d. The heat detector shall be capable of being programmed with an emergency reporting point for excessive heat or freeze detection.
 - e. The Intelligent fixed temperature detector shall be an EDWARDS SIGA-H2D.
 - 3. Rate of Rise Heat Detector
 - a. Provide intelligent combination fixed temperature / rate-of-rise heat detectors at the locations shown on the drawings.
 - b. The detector shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm. The detector shall utilize a low mass thermistor heat sensor and operate at a nominal fixed temperature alarm point rating of 135oF and at a temperature rate-of-rise alarm point of 15oF per minute. The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of thermistor data. Systems using central intelligence for alarm decisions shall not be considered as

- equal.
 - c. The heat detector shall be rated for ceiling installation at a minimum of 50 ft centers and also be suitable for wall mount applications.
 - d. The Intelligent combination fixed temperature / rate-of-rise heat detector shall be an EDWARDS SIGA-HRD.
4. Optica Photoelectric Detector,
- a. Provide analog/addressable optical (photoelectric) smoke detectors at the locations shown on the drawings.
 - b. When mounted in a sounder base, the detector shall initiate a temporal 3-3-3 when smoke is detected.
 - c. The optical smoke detector shall be suitable for direct insertion into air ducts up to 3 ft (0.91m) high and 3 ft (0.91m) wide with air velocities up to 4,000 ft/min. (0-20.32 m/sec) without requiring specific duct detector housings or supply tubes.
 - d. The optical detector shall be listed as a multi criteria detector without the use of other sensing elements, and the use of fixed end of life sensing components is not acceptable. Each optical smoke detector shall be capable of rejecting nuisance sources and detect smoke in the full life safety window of 0.5% to 4.36% obscuration/foot. Shall be listed to UL268 7th edition. Detectors that have to operate in a special application mode that cannot achieve the full 0.5% to 4.36% life safety window shall not be considered equal.
 - e. Each smoke detector shall be individually programmable to operate at any one of five (5) sensitivity settings. The detector shall also store pre-alarm and alternate pre-alarm sensitivity settings. Pre alarm sensitivity values shall be configurable in 5% increments of the alarm and alternate alarm sensitivity settings respectively. The detector shall be able to differentiate between a long term drift above the pre alarm threshold and fast rise above the threshold. The detector shall monitor the sensitivity of the smoke sensor. If the sensitivity shifts outside the UL limits, a trouble signal shall be sent to the panel. It shall be possible to automatically change the sensitivity of individual intelligent addressable smoke detectors for day and night (alternate) periods.
 - f. Each detector shall utilize an environmental compensation algorithm that shall automatically adjust for background environmental conditions such as dust, temperature, and pressure. The detector shall provide a maintenance alert signal when 80% (dirty) of the available compensation range has been used. The detector shall provide a dirty fault signal when 100% or greater compensation has been used.
 - g. The photoelectric smoke detector shall be an EDWARDS SIGA-OSD
5. Standard Detector Mounting Bases, SIGA-SB4: Provide standard detector mounting bases. The base shall, contain no electronics, support all Signature Series detector types and have the following minimum requirements:
- a. Removal of the respective detector shall not affect communications with other detectors.
 - b. Terminal connections shall be made on the room side of the base. Bases that must be removed to gain access to the terminals shall not be acceptable.
 - c. The base shall be capable of supporting one (1) Signature Series (SIGA-LED) Remote Alarm LED Indicator. Provide remote LED alarm indicators where shown on the plans.
6. Duct Detector, SIGA-SD:
- a. Provide intelligent low profile photoelectric duct smoke detectors / remote test switches at the locations shown on the drawings.
 - b. The intelligent duct smoke detector shall operate in ducts having from 100ft/min to 4,000ft/min air velocity. The detector shall be suitable for operation over a temperature range of -20 to 158F° and offer a harsh environment gasket option.

- c. Each detector shall utilize an environmental compensation algorithm that shall automatically adjust for background environmental conditions such as dust, temperature, and pressure. The detector shall provide a maintenance alert signal when 80% (dirty) of the available compensation range has been used. The detector shall provide a dirty fault signal when 100% or greater compensation has been used.
- d. The intelligent duct smoke detector shall provide a form "C" auxiliary alarm relay rated at 2amps @ 30Vdc. The position of the relay contact shall be supervised by the control panel software. Operation of the relay shall be controlled either by its respective detector processor or under program control from the control panel as required by the application. Detector relays not capable of programmed operation independent of the detector's state shall not be considered as equal. The detector shall be equipped with a local magnet-activated test switch.
- e. Each duct detector shall be installed and testing in accordance with manufacturer's instructions, including pressure differential and, velocity testing. Test results shall be submitted to the owner.
- f. Each location shall be provided with a access hatch for testing and maintenance and be accessible.
- g. Remote test switches/LED indicators shall be provided below the detector on the ceiling to indicate location of the detector in non-mechanical areas, at locations indicated on the drawings.
- h. The Intelligent Photoelectric Duct Smoke Detector shall be an EDWARDS model SIGA- SD.
- i. The remote key operated test switch / LED shall be an EDWARDS model SD-TRK

2.12 INTELLIGENT MODULES

- A. Provide addressable dual input multifunction modules at the locations shown on the drawings and as required to provide functionality required for life safety operation of the system. Each module shall provide configurable supervised Class B input/output circuits (quantity as required) for:
 - 1. Normally-Open Alarm Latching (for alarm initiation applications)
 - 2. Normally-Open Alarm Delayed Latching (for waterflow switch applications)
 - 3. Normally-Open Active Non-Latching (for limit switch and monitor applications)
 - 4. Normally-Open Active Latching (for tamper switch and supervisory applications)
 - 5. Form "C" dry contact
- B. Each module shall identify and report by device address, ground faults and opens associated with its initiating device circuits, to the control panel. Single function modules or without individual ground fault detection identification capability shall not be considered as equal.

2.13 INTELLIGENT MANUAL FIRE ALARM BOX

- A. It shall be possible to address each Signature Series fire alarm box without the use of DIP or rotary switches. The manual fire alarm box shall have a minimum of 2 diagnostic LEDs mounted on their integral, factory assembled single or two stage input module. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The manual fire alarm box shall be capable of storing up to 24 diagnostic codes that can be retrieved for troubleshooting assistance. Input circuit wiring shall be supervised for open and ground faults. The manual fire alarm box shall be suitable for operation in the following environment:
 - 1. Temperature: 32°F to 120°F (0°C to 49°C).
 - 2. Humidity: 0-93% RH, non-condensing.
- B. Double Action Manual Fire Alarm Box, SIGA-278:
 - 1. Provide intelligent double action, single stage manual fire alarm box (SIGA-278). The manual fire alarm box shall be of Lexan construction with an internal toggle switch. Provide a key locked test feature. Finish the manual fire alarm box in red with white "PULL

IN CASE OF FIRE" lettering.

C. Manual Fire Alarm Box Covers:

1. Provide manual fire alarm box cover, STI "Stopper II", over each manual fire alarm box, unless otherwise noted. They shall consist of a tamper-proof; clear Lexan polycarbonate shield and frame suitable for mounting over flush-mounted or surface-mounted manual fire alarm boxes. The cover shall contain an integral horn that will sound an 85 db warning tone when the cover is lifted. The power source shall be a 9-volt dc alkaline battery included with the unit.

2.14 CONVENTIONAL FIRE ALARM INITIATING DEVICES

A. Double-Action Manual Fire Alarm Box

1. Provide double action, single stage manual fire alarm box with screw terminals (278B series) for connection of installation wiring. All manual fire alarm boxes shall be break glass type and shall be constructed of red Lexan with white raised letters.
2. The alarm handle shall be marked "PULL FOR FIRE", to provide simple, concise instructions for activation of the manual fire alarm box by the general public. It shall be necessary to first lift an upper door marked "LIFT THEN PULL HANDLE" to gain access the alarm handle. Pulling the alarm handle shall break a glass rod and activate a toggle switch that shall cause the handle to latch in the alarm position. Momentary push button type switches shall not be acceptable. To reset the station it shall be necessary to open the station using a key or a special tool, restore the toggle switch to its normal position and replace the glass rod.

B. Heat Detectors:

1. Combination Fixed Temperature/Rate-of-Rise Heat Detectors, 281B, 282B:
 - a. Provide low profile heat detectors rated for a maximum smooth ceiling rating of (2500 sq. ft., 232 m²). The detector shall be finished pure white and have a positive identification for the operation of the fixed temperature element. The detectors shall be rated at 15°F (9°C) per minute rate-of-rise and 194°F (88°C) fixed temperature.
2. Fixed Temperature Heat Detectors, 283B, 284B:
 - a. Provide low profile heat detectors rated for a maximum smooth ceiling rating of (2500 sq. ft., 232 m²). The detector shall be finished pure white and have a positive identification for the operation of the fixed temperature element. The detectors shall be rated at 194°F (88°C) fixed temperature.

C. Smoke Detectors:

1. Photoelectric Smoke Detectors, EC2 Series:
 - a. Provide stable, solid state, photoelectric detectors capable of detecting visible products of combustion. Provide the detectors with self-compensating circuitry to protect its stability against the effects of aging, dust and film accumulation. Protect the measuring chamber from damage and insects. Provide a built-in five second delay to minimize alarms due to transient smoke. Safeguard and protect circuitry against electrical transients, electromagnetic interference, and polarity reversal.
 - b. Factory set the detector sensitivity. Provide a remote LED alarm indicator where shown on the plans. The detector shall be tamper resistant plug mounted to a separate base. A built-in shorting device shall permit checking of the installation wiring before detector installation. Provide a concealed test switch to allow full logical testing without the use of smoke or aerosol sprays.

D. Air Duct Smoke Detectors, SD-2W:

1. Provide stable, solid state, photoelectric (SD-2W) air duct smoke detector heads capable of detecting visible and invisible products of combustion. Provide the detectors with a measuring chamber and a protected reference chamber sensitive to changes in temperature and humidity only. Protect the measuring chamber from damage and insects. Provide a built-in five second delay to minimize alarms due to transient smoke.
2. Variations in duct air velocity between 400 and 4,000 FPM (2 and 20.3 m/sec.) shall not

cause any false alarms. Safeguard radioactive parts and protect circuitry against electrical transients, electromagnetic interference, and polarity reversal. Factory set the detector sensitivity. Mount the detector head in an enclosure suitable for mounting to a air duct. Provide an air sampling tube that extends into the duct air stream. Provide a LED alarm indicator on the enclosure and a key operated alarm indicator/test switch.

- E. Beam Type Smoke Detectors, EC-3000 series:
1. Provide projected beam type smoke detectors. The beam detectors shall be four wire 24 VDC and powered from the control panel 4 wire smoke power source. This unit shall consist of a separate transmitter and receiver capable of being powered separately or together. This unit shall operate in either a short range of 30 to 100 ft. (9.14 to 30.4 m) or a long range of 100 to 300 ft. (30.4 to 91.4 m). The detector shall feature a bank of four alignment LEDs on both the receiver and transmitter that are used to ensure proper alignment without the use of special tools.
 2. The beam detector shall feature automatic gain control that will compensate for gradual signal deterioration from dirt accumulation on lenses. Ceiling or wall mount as shown on the plans. Testing shall be carried out using calibrated test filters. Provide a key activated remote test station.

2.15 NOTIFICATION APPLIANCES

A. General

1. Appliances shall be U.L. Listed for Fire Protective Service.
2. Strobe appliances or combination appliances with strobes shall be capable of providing the "Equivalent Facilitation" which is allowed under the Americans with Disabilities Act Accessibilities Guidelines (ADA(AG)), and shall be UL 1971, and ULC S526 Listed.
3. Appliances shall be of the same manufacturer as the Fire Alarm Control Panel specified to ensure absolute compatibility between the appliances and the control panels, and to ensure that the application of the appliances are done in accordance with the single manufacturers' instructions.
4. Appliances that do not meet the above requirements, and are submitted for use shall be provided with written proof of their compatibility for the purpose intended. Such proof shall be in the form of documentation from all manufacturers which clearly states that their equipment (as submitted) are 100% compatible with each other for the purposes intended.
5. Initial settings for all devices with field selectable settings shall be set in accordance with the values indicated on the Drawings. Values shall be included on the Shop Drawing and As-built Drawing submittals.

B. Synchronized Strobes

1. Strobes shall flash at a rate of one flash per second and shall be synchronized indefinitely within 10 milliseconds of other strobes per UL 1971 Standard.
2. Indoor Wall Mounted Strobes, Genesis Series: Provide strobes manufactured by EST. In - Out screw terminals shall be provided for wiring. The strobes shall have a white face plate. They shall provide field configurable 15 cd, 30 cd, 75 cd or 110 cd synchronized flash outputs as required by the application. The strobe shall have lens markings oriented for wall mounting.
3. Indoor Ceiling Mounted Strobes, Genesis Series: Provide strobes manufactured by EST. In - Out screw terminals shall be provided for wiring. The strobes shall have a white face plate. They shall provide field configurable 15 cd, 30 cd, 75 cd or 95 cd synchronized flash outputs as required by the application. High output strobes shall provide field configurable 95 cd, 115 cd, 150 cd or 177 cd synchronized flash outputs as required by the application

C. Horn/Strobes

1. Horn/strobes shall flash at a rate of one flash per second and shall be synchronized indefinitely within 10 milliseconds of other strobes per UL 1971 Standard.

2. Indoor Wall Mounted Horn/Strobes, Genesis Series: Provide horn/strobes manufactured by EST. In - Out screw terminals shall be provided for wiring. The horn/strobes shall have a white face plate. They shall provide field configurable 15 cd, 30 cd, 75 cd or 110 cd synchronized flash outputs as required by the application. Horn shall be field selectable for low or high output.
 3. Indoor Ceiling Mounted Horn/Strobes, Genesis Series: Provide horn/strobes manufactured by EST. In - Out screw terminals shall be provided for wiring. The horn/strobes shall have a white face plate. They shall provide field configurable 15 cd, 30 cd, 75 cd or 95 cd synchronized flash outputs as required by the application. High output strobes shall provide field configurable 95 cd, 115 cd, 150 cd or 177 cd synchronized flash outputs as required by the application. Horn shall be field selectable for low or high output.
- D. Outdoor Horn/Strobes
1. Temporal Horn/Strobes, 757 Series
 - a. Provide electronic horn/strobes manufactured by EST, Cat. No. 757 Series. In - Out screw terminals shall be provided for wiring. The horn/strobe shall have a red plastic housing. Horn/strobes shall be selectable for high or low dBA output. Selection of low or high output shall be reversible. Horns shall be selectable for steady or temporal output. Selection of steady or temporal output shall be reversible.
 - b. The strobe shall provide 15/75 cd synchronized flash output as required by the application. The strobe shall have lens markings oriented for wall mounting.
 - c. Provide weatherproof wall boxes for outdoor mounting.
- E. Speakers:
1. Wall Mount: Provide speakers with a Mylar cone as manufactured by EST, Genesis Series. Paper type cones are not acceptable. The rear of the speaker shall be completely sealed protecting the cone during and after installation. In - Out screw terminals shall be provided for wiring. Speaker housings shall be white. Speakers shall be provided for use with 70V systems. Speakers shall provide power taps at 1/4w, 1/2w, 1w, and 2w selectable via switch mounted on unit. Speakers shall provide UL confirmed 90 dBA sound output at 2w.
 2. Ceiling Mount: Provide speakers with a 4 inch Mylar cone as manufactured by EST, Genesis Series. Paper type cones are not acceptable. The rear of the speaker shall be completely sealed protecting the cone during and after installation. In - Out screw terminals shall be provided for wiring. Speaker shall be round, surface mount, slim profile with white finish. Speakers shall be provided for use with 70V systems. Speakers shall provide power taps at 1/4w, 1/2w, 1w, and 2w selectable via switch mounted on unit. Speakers shall provide UL confirmed 90 dBA sound output at 2w.
- F. Speaker/Strobes:
1. Wall Mount: Provide speaker/strobes with as manufactured by EST, Genesis Series.
 - a. Provide speaker with Mylar cone. Paper type cones are not acceptable. The rear of the speaker shall be completely sealed protecting the cone during and after installation. In - Out screw terminals shall be provided for wiring. Speaker/strobe housings shall be white . Speakers shall be provided for use with 70Vsystems. Speakers shall provide power taps at 1/4w, 1/2w, 1w, and 2w selectable via switch mounted on unit. Speakers shall provide UL confirmed 90 dBA sound output at 2w.
 - b. Provide strobe with provide field configurable 15 cd, 30 cd, 75 cd or 95 cd synchronized flash outputs as required by the application. The strobe shall have lens markings oriented for wall mounting.
 - c. Provide high candela output strobe with field configurable 95 cd, 115 cd, 150 cd or 177 cd synchronized flash outputs as required by the application. The strobe shall have lens markings oriented for wall mounting.
 2. Ceiling Mount: Provide speaker/strobes as manufactured by EST, Genesis Series.
 - a. Provide speaker with Mylar cone. Paper type cones are not acceptable. The rear of the speaker shall be completely sealed protecting the cone during and after

installation. In - Out screw terminals shall be provided for wiring. Speaker shall be round, surface mount, slim profile with white finish. Speakers shall be provided for use with 70V systems. Speakers shall provide power taps at 1/4w, 1/2w, 1w, and 2w selectable via switch mounted on unit. Speakers shall provide UL confirmed 90 dBA sound output at 2w.

- b. Provide strobe with provide field configurable 15 cd, 30 cd, 75 cd or 95 cd synchronized flash outputs as required by the application. The strobe shall have lens markings oriented for ceiling mounting.
- c. Provide high candela output strobe with field configurable 95 cd, 115 cd, 150 cd or 177 cd synchronized flash outputs as required by the application. The strobe shall have lens markings oriented for wall mounting.

G. Sprinkler Bell:

1. Provide electrically operated, 10 inch diameter, red color alarm gong with "Call Fire Dept." sign. Refer to mechanical drawings for locations. Coordinate exact mounting height and location with the Architect. EST 439D-10AW on weatherproof back box.

2.16 ANCILLARY DEVICES

A. Remote Relays:

1. Multi Voltage Control Relays, MR-100 Series: Provide remote control relays connected to supervised ancillary circuits for control of fans, dampers, door releases, etc. Relay contact ratings shall be SPDT and rated for 10 amperes at 115 VAC. A single relay may be energized from a voltage source of 24 VDC, 24 VAC, 115 VAC, or 230 VAC. A red LED shall indicate the relay is energized. A metal enclosure shall be provided.
2. Multi Voltage Control Relays, MR-200 Series: Provide remote control relays connected to supervised ancillary circuits for control of fans, dampers, door releases, etc. Relay contact ratings shall be DPDT and rated for 10 amperes at 115 Vac. A single relay may be energized from a voltage source of 24 VDC, 24 VAC, 115 VAC, or 230 VAC. A red LED shall indicate the relay is energized. A metal enclosure shall be provided.

2.17 ELECTROMAGNETIC DOOR HOLDERS, 1500 SERIES

A. Provide electromagnetic door holders with the following features.

1. Flush mounted wall units or floor units as required by door and application.
2. Silent operation.
3. Minimum 25 Lbf. (111 Nt) holding force.
4. 24VAC operation.
5. Finish shall be brushed zinc.
6. EST 1500 Series.

2.18 SYSTEM MAP

- A. On wall beside Fire Alarm Control Panel, provide system map, framed under clear 1/8 inch plexiglass. Map shall consist of a basic floor plan of the entire building.
- B. Orient map in a manner that is consistent with the building. Rotate graphic layout and map as required to show North, South, East, and West as it applies to the specific building.
- C. Map shall show the location of every fire alarm initiating device in the building. Each device shall be assigned a unique sequential number, starting with "#01". This number shall be indicated on the map, along with the device type, and the number shall be marked on the device's base.
- D. LCD display on Fire Alarm Control Panel shall be programmed to give English-language description of each device by type, identifying number, and location. Example: "Sprinkler Zone 1 Flow Switch #01 (1983 Boiler Room)." Use actual room numbers, where available.
- E. Show location of remote test switches.

2.19 CONDUCTORS

- A. In general, conductors shall be of the sizes and types recommended by the system

manufacturer.

- B. Voltage drop on Notification Appliance Circuits shall not exceed 10% at the most distant device on each circuit.

2.20 SPARE CAPACITY

- A. Signaling Line Circuits and Notification Appliance Circuits shall be sized to provide 20% spare capacity to allow future addition of devices.

2.21 SECONDARY SUPPLY CAPACITY AND SOURCES

- A. Standby battery capacity shall have sufficient capacity to operate the system under maximum quiescent load (system functioning in a non-alarm condition) for a minimum of 24 hours; and, at the end of that period, shall be capable of operating all alarm notification appliances used for evacuation or to direct aid to the location of an emergency for 5 minutes.
- B. The secondary power supply for emergency voice/alarm communications service shall be capable of operating the system under maximum quiescent load for 24 hours and then shall be capable of operating the system during a fire or other emergency for a period of 2 hours. Fifteen minutes of evacuation alarm operation at maximum connected load shall be considered the equivalent of 2 hours of emergency operation. For a combination system, the secondary supply capacity required above shall include the load of any non-fire related equipment, functions, or features which are not automatically disconnected upon transfer of operating power to the secondary supply.
- C. The secondary supply shall consist of the following:
 - 1. A storage battery arranged in accordance with NFPA 72.
 - 2. Operation on secondary power shall not affect the performance of the fire alarm system.

PART 3 - EXECUTION

3.01 INSTALLATION (GENERAL)

- A. The entire system shall be installed in a workmanlike manner in accordance with approved manufacturer's manuals and wiring diagrams. Furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation. Wiring shall be of the type recommended by the NEC, approved by local authorities having jurisdiction for the purpose, and shall be installed in dedicated conduit throughout.
- B. Penetration of floor slabs and fire walls shall be fire stopped in accordance with all local fire codes.
- C. Mount the Fire Alarm Control Panel enclosures in the locations shown on the Drawings. Coordinate exact mounting locations.
- D. Field coordinate exact mounting locations.
 - 1. Where field conditions (such as conflicts with other features, obstructions that violate the placement rules of the applicable Fire Code, and the like) make necessary the relocation of detectors from the positions shown on the plans, such relocations shall be made in strict accordance with the applicable Fire Code, and shall be made at no additional cost to the Owner.
 - 2. As far as possible within the rules of the applicable Fire Code, the final placement of exposed detectors shall present a uniform appearance.
- E. Adjust each detector in accordance with manufacturer's recommendations for the specific location and circumstance.
- F. Detectors shall be installed a minimum of 3 feet from any supply or return air diffuser.
- G. Control functions which include outputs activated by specific inputs, such as door releases, elevator recall, fan shutdown, damper operation, etc., shall have both inputs and associated outputs connected to the same control panel. Control functions shall be accomplished with addressable control modules. Control through relay bases is not acceptable.

- H. Relays shall be located within three feet of the device or circuit controlled or monitored in accordance with NFPA 72.
- I. Coordinate exact mounting locations with the reflected ceiling plans. Coordinate exact mounting heights with architectural elevations.
- J. Provide 3/4 inch C.O. with pull string between Fire Alarm Control Panel (FACP) and Telephone Terminal Board (TTB) for future use. This conduit shall be in addition to any conduits required for this project.
- K. Detectors and horn/strobes in gyms shall be equipped with vandal-resistant wire guards. Provide backing in ceiling or walls to withstand all forces that the guards must withstand.
- L. End of Line Resistors shall be furnished as required for mounting as directed by the manufacturer.

3.02 SYSTEM WIRING

- A. Wiring shall be in metal raceways shared by no other system. Raceways shall be installed in accordance with Section 26 0533 - Conduit and Fittings. Fire alarm conduit shall be identified in accordance with Section 26 0533 - Conduit and Fittings.
- B. Field devices shall be installed in accordance with Section 16131 - Outlet Boxes. Paint boxes and covers red.
 - C. Install Conductors in accordance with Section 26 0519 - Wire and Cable. Wires shall be landed on device terminals, or terminal strips or blocks, and shall be labeled and numbered at their terminations. Wiring shall be installed in a neat and workmanlike manner. Bundles of wiring shall be secured with self-locking nylon cable ties, not tape. If terminal strips or blocks are required to transition wire size down at devices, they shall not be located in the device junction box unless adequate space is available. Surface mounted box extensions shall not be used at recessed device locations to provide adequate room. If required, locate terminal strips or blocks in properly sized, separate junction boxes, located in accessible ceiling spaces. Clearly mark covers of junction boxes per Section 26 0000 - Electrical General Requirements.

3.03 DUCT DETECTORS

- A. Smoke dampers and fire/smoke dampers: Coordinate installation of duct-mounted detectors for control of smoke dampers and smoke/fire dampers with Divisions 21, 22 and 23 and the Contracting Agency. Locate duct mounted smoke detectors within five feet of smoke/fire dampers with no air inlets or outlets between detector and damper. Damper shall close when smoke detector goes into alarm.
- B. Air Handling Units: Coordinate installation of duct-mounted detectors with Divisions 21, 22 and 23 and the Contracting Agency. Duct detectors shall be located in accordance with NFPA 72 and manufacturer's recommendation to the greatest extent practical. Proposed duct detector locations shall be submitted for approval prior to installation of any equipment. Submit duct detector differential pressure measurements to verify proper operation of duct detectors.
- C. Provide remote test stations for all duct mounted smoke detectors. Provide a descriptive label in accordance with Section 26 0000 - Electrical General Requirements - IDENTIFICATION. Field coordinate location of remote test stations with the Contracting Agency.

3.04 DETECTORS FOR DOOR RELEASE SERVICE

- A. Ceiling-mounted detectors for door release service shall be centered on the opening, at a maximum distance of 5 feet-0 inches from opening. Minimum distance from opening shall be as noted in NFPA 72.
- B. Overhead Doors: Provide local release only for overhead doors.

3.05 MAGNETIC DOOR HOLDERS

- A. Unless otherwise noted or specified or dictated by the specified holder design, magnetic door holders shall be mounted near the top of the doors they serve, and within 6 inches of the latch- side edge of each door served. Provide backing attached to wall studs to support door

holder junction box.

- B. Door holders shall produce no objectionable hum. Repair, replace, or relocate holders that produce audible hum.

3.06 PROTECTION OF FIRE ALARM CONTROL UNITS

- A. Provide automatic smoke detection at the location of each fire alarm control unit(s) including fire alarm control panels, remote power supplies and remote booster power supplies.

3.07 INTERCONNECTIONS TO OTHER SYSTEMS

- A. Provide control module contacts in elevator machine rooms for connection to elevator controllers. Provide sufficient modules and contacts to obtain specified recall functions. Coordinate connections and obtain services of qualified personnel as required to modify existing elevator controls for specified functions.
- B. Provide input modules for monitoring of sprinkler flow, tamper, and low air pressure switches. Provide sufficient modules to give each switch an individual address. Connect supervised circuits from modules to switches and program system to provide specified functions for each switch.
- C. Connect existing kitchen hood extinguishing systems to fire alarm system so that activation of extinguishing system results in a general fire alarm condition. Provide control and monitor modules and connections to the existing extinguishing system panel alarm contacts to provide fire alarm functions and maintain existing shutdown functions. Coordinate connections with current panel service provider.
- D. Provide control module at lighting control system headend to illuminate building lighting as required for building exiting and emergency response.
- E. Interface fire alarm system to building automation system to alert system to alarm, trouble, or supervisory conditions. Life safety protective functions shall be performed directly via the fire alarm system and not through the building automation system.

3.08 REMOTE DETECTOR INDICATORS

- A. Provide remote LED indicators for duct mounted smoke detectors where the detector is mounted and where the LED alarm indicator is not easily visible.
- B. Field coordinate location of remote test switch in accessible location, confirm with facilities.

3.09 PROGRAMMING

- A. Provide system programming as required for operation of system as specified. Submit device locations and numbering scheme for approval prior to programming device descriptions.
- B. Reprogram system after substantial completion to make any Owner requested changes and to optimize system performance. Provide additional reprogramming during warranty period as required for proper system operation.

3.10 TESTING AND REPORTS

- A. Upon completion of the system installation, an Approved representative of the system manufacturer shall conduct a thorough test of the system and all related devices and components of the system, and submit a written report of the findings to the Contracting Agency at least 72 hours prior to the substantial completion site observation. The testing shall include, at the least, verification of the following:
 1. The functional operation of each resettable initiating device (manual fire alarm boxes, detectors, etc.) and circuit.
 2. The functional operation of each and every alarm device and circuit.
 3. The functional operation of each monitored device circuit.
 4. The functional operation of each control and output circuit.
 5. The supervision function of each Initiating, Indicating, Monitoring, Control and Supply Circuit.
 6. Central Station automatic signaling.

7. Proper initiation and execution of mechanical systems control sequences.
8. Verify that wire size, power supply, number of devices on a circuit, etc. are suitable to support 100% of devices being in alarm or operated simultaneously. Test shall include the following as a minimum:
 - a. Place all detectors and monitor modules in alarm. Each shall display its address and alarm condition. At least the first ten devices on each circuit shall also have their alarm LEDs lighted, where applicable.
 - b. Operate all control modules for the alarm or operated condition. Each module shall display its address and condition.
 - c. Reset all alarmed and operated devices. The panel shall display the address of any off-normal devices.
9. Test a representative number of detectors for alarm verification by momentarily testing for alarm. The detectors shall not initiate an alarm. Then test by placing the detectors in alarm such that it remains in alarm for the selected verification time. The detector shall initiate an alarm.
10. Test a representative number of detector for trouble by removing the detector from its base. The address and trouble condition for each shall be displayed. Insert a different type of detector into the base. The address and trouble condition shall be displayed. The detector shall return to normal only when the proper detector type is reinserted into the base.
11. Print out the English-language descriptor, currently sensed value, prealarm threshold value, alarm threshold value and status of each sensor in the system. Also print out the English- language descriptor and status of each module in the system. The printout shall also include the date and time.

3.11 TRAINING

- A. After the system provided in this Section is completely installed and operational, and at a time chosen by the Owner, provide the Owner's system operators and maintenance personnel and representatives of the local Fire Department with a total of eight (8) hours of instruction on the operation, maintenance, and troubleshooting of equipment provided under this Section.
- B. Training sessions shall be presented by a fully qualified, trained representative of the equipment manufacturer, who is thoroughly knowledgeable on the specific installation. Separate sessions shall be given for operation personnel (i.e.: facility staff and Fire Department) and maintenance personnel, with the length and content of the sessions tailored to the respective groups.
- C. Provide an additional two (2) hours of follow-up instruction for review and clarification at a later time mutually agreed on with the Owner, if the Owner deems it necessary.
- D. Training sessions shall be recorded (video and audio) in digital format. Two (2) copies of the recorded sessions shall be provided on a portable USB thumb drive to the Owner.

3.12 ACCEPTABLE INSTALLERS

- A. The Fire Alarm / Life Safety System specified herein shall be installed by a Factory Trained and Authorized Engineered Systems Distributor.
- B. Field Connected Devices may be installed and wired by licensed contractors under the direct supervision of a Factory Trained and Authorized Engineered Systems Distributor. Installation shall be supervised and tested by trained representatives of the manufacturer of the system equipment who shall have a State fire alarm license.

3.13 EXAMINATION

- A. Prior to the commencement of any of the work detailed herein, an examination and analysis of the area(s) where the Fire Alarm / Life Safety System and associated components are to be installed shall be made.
- B. Any of these area(s) which are found to be outside the manufacturers' recommended environments for the particular specified products shall be noted on a Site Examination Report

which shall be given to Contracting Agency.

3.14 DEMONSTRATION

- A. Each of the intended operations of the installed Fire Alarm / Life Safety System shall be demonstrated to the Contracting Agency and the Local Authority Having Jurisdiction by the Installing Engineered System Distributor.

3.15 FIELD QUALITY CONTROL

- A. Document each installation and operational step in accordance with approved shop drawings and manufacturer's requirements.

END OF SECTION