Project Manual for:

ITD D5 Maintenance Building Addition and Renovation and New Brine Facility

Blackfoot, Idaho

ITD Program No: D225080

FEBRUARY 2023

Myers ▪ Anderson

Architecture ▪ Interiors ▪ Planning ▪ Preservation

BID SET

PROJECT MANUAL FOR

ITD D5 Maintenance Building Addition and Renovation and New Brine Facility
Blackfoot, Idaho

Idaho Transportation Department
District 5
5151 South 5th Avenue
Pocatello, ID 83204

February 2023

ITD Program No: D225080
Architect's Project No. 22569

OWNER
Idaho Transportation Department
11331 West Chinden Boulevard, Building 8
Boise, Idaho 83714

CONSTRUCTION MANAGER
Bateman Hall, Inc.
1405 Foote Drive
Idaho Falls, ID 83204
(208) 523-2681

ARCHITECT
Myers Anderson Architects
122 South Main Street, Suite 1
Pocatello, ID 83204
(208) 232-3741
maa@myersanderson.com

STRUCTURAL
Frost Structural Engineering
1020 Lincoln Road
Idaho Falls, ID 83401
(208) 227-8404

MECHANICAL
Musgrove Engineering, PA
234 South Whisperwood Way
Boise, ID 83709
(208) 384-0585

ELECTRICAL
Musgrove Engineering, PA
645 West 25th Street
Idaho Falls, ID 83402
(208) 523-2862

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DIVISION 00 - Procurement and Contracting Requirements

SECTION 000010 - TABLE OF CONTENTS

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SECTION 000030 – ADVERTISEMENT FOR BIDS

PRIME CONTRACT PACKAGES for:
D225080 - D5 BLACKFOOT MAINTENANCE EXTENSION & RENOVATION
Idaho Transportation Department (ITD), Blackfoot, Idaho

Bid Packages shall consist of multiple individual trade scope packages that will be direct prime contracts with ITD. ITD has retained a CM Agent (Bateman-Hall, Inc.) to help coordinate the management of the overall project.

Each Prime Contractor will be required to cooperate and coordinate with the CM and all other Contractors to perform their work in accordance with a Master Project Schedule developed, updated, and maintained by the CM. Each Prime Contractor will be required to provide specified scheduling information necessary to maintain the Master Project Schedule and to meet the milestone completion dates as identified on the Bid Form and in each Prime Contract**.**

PROJECT SCOPE: The project scope entails an addition or enlargement to the existing maintenance building. The existing building consists of six vehicle repair bays, office and meeting spaces, two restrooms and an existing mezzanine above the office area (only). Renovations are scheduled for the garage bays and the restroom plumbing fixtures are scheduled to be replaced. Refer to the full drawings and specifications for demolition vs new construction information. Also, part of this project is a separate building for brine production and brine tank storage. Refer to Section 01 23 00 “Alternates” for full scope of base bid vs add alternate.

All work shall be performed in accordance with Contract Documents, Plans, Specifications, Department of Public Works Standards, The International Building Code, and as directed by the ITD Representatives.

BID PACKAGES Will be as per BID PACKAGE INDEX (Spec Section 000031).

Complete Bidding Documents will be available beginning **February 28th, 2023**. Plans (on a CD) will be made available at no cost from Bateman-Hall, Inc. at 208-523-2681. Plans can be purchased from Bonneville Blueprint in Idaho Falls.

Plans can also be viewed or **downloaded** on smartbidnet.com. If you do not have a username and password, please send a request by email to bids@bateman-hall.com. Please include the following: Company Name, Contact Person, Phone Number, Fax or E-mail, Company Scope of Work, and States the company works in.

PRE-BID CONFERENCE: Will be held at **10:00 AM on March 9th, 2023** at the project location of ITD Blackfoot Office, 50 N 380 W, Blackfoot, ID 83221. Attendance is highly recommended.

COMMUNICATION: All communication is to be through Bateman-Hall, Inc. **Requests for clarification or interpretation of the Bidding Documents must be in writing and received no**

later than March 16th, 2023 at noon. Questions received after the above-noted deadline may be answered at the discretion of the ITD Representative.

Revisions, additions, and deletions will be made by written addenda issued by the CM and/or Myers Anderson Architects. Only questions answered by formal written addenda will be binding. Oral and other interpretations or clarifications will be without legal effect. Questions may be mailed, e-mailed, or faxed to:

Vanessa Josephson, Bateman-Hall, Inc.
P.O. Box 1464, Idaho Falls, Idaho 83403-1464
Phone: 208-523-2681 Fax: 208-524-4435
E-mail: vanessa.josephson@bateman-hall.com

BID DATE: All bids are to be submitted in a sealed and labeled envelope on **Tuesday, March 21st, 2023.**

BID TIMES - STAGGERED (Mountain Time Zone): Bid due times will be staggered by bid package (identified below) and will be opened and read publicly immediately following the closing of each bid package.

Bid Package (BP) #	BP Description	Submission Deadline
BP-02 FM52322	Demolition	12:59 59 PM
BP-03 FM52323	Concrete	
BP-04 FM52324	Masonry	1:14 59 PM
BP-05 FM52325	Structural/Misc Steel	1:29 59 PM
BP-06 FM52326	Metal Canopy	
BP-07 FM52327	Wood Framing	1:44 59 PM
BP-08 FM52328	Roofing	1:59 59 PM
BP-09 FM52329	Windows	2:14 59 PM
BP-10 FM52330	Doors	
BP-11 FM52331	Overhead Doors	
BP-12 FM52332	Drywall & Insulation	2:29 59 PM
BP-13 FM52333	Painting	2:44 59 PM
BP-14 FM52334	*(Not Used)*	2:59 59 PM
BP-15 FM52335	LVP Flooring	
BP-16 FM52336	Specialty Items	
BP-17 FM52337	Fire Suppression	3:14 59 PM
BP-18 FM52338	Plumbing & HVAC	3:29 59 PM
BP-19 FM52339	Electrical	3:44 59 PM

Each sealed envelope should be labeled with the following: **Company's Name, Address, "Sealed Bid Enclosed for D225080", Bid Package Name and Number**.

Bids will be received only at: ITD POCATELLO OFFICE
5151 S 5th Ave
Pocatello ID 83204-2202

FAXED OR EMAILED BIDS WILL NOT BE ACCEPTED.
This Public Works project **IS NOT** financed in whole or in part by federal funds. Contractors will be required to pay not less than the minimum wage established by the Idaho Legislature or by the Department of Labor - State of Idaho that is in effect at the time the contract is awarded.

Contractors shall be licensed in the State of Idaho in accordance with the provisions of the **Idaho Public Works Contractors' State License Law.**

The Owner reserves the right to accept or reject any and all proposals with or without cause, for any reason determined in its sole subjective determination to be in its best interest and to waive any informality in bidding.

ITD will determine whether to award the Contract within a period not to exceed forty-five (45) days from Bid Opening Date and will notify the Bidders of the determination. **All Bidders are expected to honor their proposals for the 45-day review period.**

Bid Bond will be required by Contractors for this project at the rate of **5% of the total bid** and is to be included in the sealed envelope. Form of Bid Bond must be in the form of a surety bond or may be a cashier's check or money order made to the order of "Idaho Transportation Department" as outlined by Idaho Statutes for public work projects.

Final Addendum will be issued on Friday, March 17th, 2023.

-END OF ADVERTISEMENT FOR BIDS-

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SECTION 000031 – BID PACKAGE INDEX

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BP-02 Demolition (FM52322)

Contract Documents including all drawings and the following specifications:

- Division 00 – Procurement and Contracting Requirements
- Division 01 – General Requirements
- Division 02 – Existing Conditions

Work to Include, but not limited to the supply and installation of:

Removal of the following items as identified on the drawings:

- Interior wall (including Gypsum)
- CMU Walls
- Concrete (footings, walls and aprons)
- Asphalt, as necessary for new construction
- Bond Beam
- Concrete Slab demo for new fire riser location

Cut opening for new access hatch;
Shoring & Bracing as necessary to maintain integrity of existing structure during new construction (including design calculations);
Clean-up and Waste Disposal of own work;

BP-03 Concrete (FM52323)

Contract Documents including all drawings and the following specifications:

- Division 00 – Procurement and Contracting Requirements
- Division 01 – General Requirements
- Division 02 – Existing Conditions (as applicable to this scope package)
- Division 03 – Concrete
- 07 90 00 – Joint Protection (as applicable to this scope package)

Work to Include, but not limited to the supply and installation of:

All concrete associated with both buildings (interior & exterior) and the containment structure;
Excavation and backfill, including structural fill and compaction as necessary;
Aggregate base course for slabs and Associated Site Concrete;
Concrete pumping (as required);
Exposed concrete sack finishes (as required);
Finish grading away from buildings and structure;
Placement of structural steel embeds;
Grout column base plates (including at the tank structure);
Clean-Up and Waste Disposal of Own Work;
Coordinate with plumber on installation of plumber's trench drains;
Supply and installation of:

- Bollards
- Reinforcement
- Anchor bolts
- Rigid Insulation at foundation walls and slab
- Expansion materials
- Concrete sealants
- Concrete sealer (including power wash and prep prior to)
- Weather protection, if needed
- Concrete washout for SWPPP
- Floor slab pour-back at new fire riser

BP-04 Masonry (FM52324)

Contract Documents including all drawings and the following specifications:

- Division 00 – Procurement and Contracting Requirements
- Division 01 – General Requirements
- Division 04 – Masonry
- 07 90 00 – Joint Protection (as applicable to this scope package)

Work to Include, but not limited to the supply and installation of:

CMU Walls;
Layout and Placement of embeds;
Drill and epoxy masonry rebar in concrete;
Installation of hollow metal frames in masonry walls (coordinate with supplier);
Shoring and bracing (as required);
Cell Fill;
Protection of Masonry;
Protection of adjacent work during construction;
Point, Patch and Cleaning of all Masonry;
Dust Control;
Concrete washouts for own work;
SWPPP Maintenance and repairs for Own Work;
Clean-Up and Waste Disposal of Own Work.
Supply and Installation of:

- Reinforcement
- Lintels
- Weather protection, if needed

BP-05 Structural/Misc. Steel (FM52325)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
05 12 00 – Structural Steel Framing
05 50 00 – Metal Fabrications

Work to Include, but not limited to the supply and installation of:

Structural Steel;
Anchor Bolts and Anchor bolt templates;
Gas Meter Cover;
All Steel Embeds;
All Misc. Steel except for masonry lintels (masonry lintels will be supplied by BP-04 Masonry);
Includes steel for door jambs and overhead doors;
Connection Clips and Plates;
Field Verify Dimensions;
Equipment Required to Perform Work (including crane if needed);
Chipping and Touch Up Painting of own welds;
All Bearing Pads, Shim Packs and Bolts;
Clean-up and Waste Disposal of own work;
Protection of own work;

BP-06 Metal Canopy (FM52326)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
Division 13 – Special Construction
05 12 00 – Structural Steel Framing (as applicable to this scope package)
05 50 00 – Metal Fabrications (as applicable to this scope package)
07 90 00 – Joint Protection (as applicable to this scope package)

Work to Include, but not limited to the supply and installation of:

Metal canopy structure;
Engineered Drawings;
Anchor bolts;
Flashing to Brine Facility;
Equipment Required to Perform Work (including crane if needed);
Clean-up and Waste Disposal of own work;

BP-07 Wood Framing (FM52327)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
Division 06 – Wood, Plastics and Composites
07 26 00 – Vapor Retarders (as applicable to this scope package)
08 12 14 – Standard Steel Frames (as applicable to this scope package)

Work to Include, but not limited to the supply and installation of:

Walls;
joists;
Rough hardware, hangers and ledger;
Window prep;
Blocking;
Set door jambs;
Weather Barrier where shown on drawings;
Layout of own work;
Equipment Required to Perform Work (including crane if needed);
Clean-up and Waste Disposal of own work

BP-08 Roofing (FM52328)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
07 41 13.13 – Formed Metal Roof Panels
07 42 13 – Metal Wall Panels
07 62 00 – Sheet Metal Flashing and Trim
07 71 00 – Roof Specialties
07 71 23 – Manufactured Gutters and Downspouts
07 90 00 – Joint Protection (as applicable to this scope package)
Roofing Warranty

Work to Include, but not limited to the supply and installation of:

Removal of existing roofing, gutters, downspout, facia and trim on the maintenance building;
New roofing, gutters, downspouts, facia, trim, soffits and insulation for the maintenance building;
Metal roof, soffit, facia and trim for the brine building;
Provide Unit Price to repair damaged cover board and insulation that was to remain;
Splashblocks;
Caulking of own work;
Clean-Up and Waste Disposal of Own Work.

BP-09 Windows (FM52329)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
07 25 00 – Weather Barriers (as applicable to this scope package)
07 90 00 – Joint Protection (as applicable to this scope package)
08 53 13 – Vinyl Windows
08 80 00 - Glazing

Work to Include, but not limited to the supply and installation of:

New windows for both buildings;
Pre-Finished metal drip edge at windows;
All caulking, sealants and material for the continuous weather and moisture barrier requirements;
Finish sealants to the adjacent finish surfaces such as masonry, drywall, EIFS, etc.;
Removal of all stickers;
Clean-Up and Waste Disposal of Own Work.

BP-10 Doors (FM52330)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
07 90 00 – Joint Protection (as applicable to this scope package)
08 12 14 – Standard Steel Frames
08 13 14 – Standard Steel Doors
08 14 16 – Flush Wood Doors
08 71 00 – Door Hardware

Work to Include, but not limited to the supply and installation of:

Doors, frames and hardware;
Include additional adjustment of hardware after three months of use;
Prep and Installation of all Door Frames (Masonry Wall Frame Installation will be by Mason – Coordinate and Special Instruction with Mason including foaming of the door frames for hardware prep.);
Prep all doors and frames for paint (including bondo as needed);
Clean-Up and Waste Disposal of Own Work.

BP-11 Overhead Doors (FM52331)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
08 36 13 – Sectional Doors

Work to Include, but not limited to the supply and installation of:

Overhead doors with motors;
Windows/glass @ OH Doors;
Layout and Field Measurement of own work;
Clean-Up and Waste Disposal of Own Work.

BP-12 Drywall & Insulation (FM52332)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
05 40 00 – Cold-Formed Metal Framing
07 21 13 – Board Insulation
07 21 16 – Blanket Insulation
07 25 00 – Weather Barriers
07 26 00 – Vapor Retarders (as applicable to this scope package)
07 41 13.13 – Continuous Insulation with Composite Framing Support System
07 90 00 – Joint Protection (as applicable to this scope package)
08 12 14 – Standard Steel Frames (as applicable to this scope package)
09 21 16 – Gypsum Board Assemblies
09 22 16 – Non-Structural Metal Framing

Work to Include, but not limited to the supply and installation of:

Drywall, tape and texture;
Ceilings (gypsum and suspended);
Fire Rated materials where required;
Wall and Ceiling Insulation (including rigid with Z-clips);
Vapor barrier;
Sealant at wall to slab;
FRP panels;
Clean-Up and Waste Disposal of Own Work.

BP-13 Painting (FM52333)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
09 90 00 – Painting and Coatings

Work to Include, but not limited to the supply and installation of:

Painting complete including walls, floors, doors, ceilings and bollards;
Indicator striping as per A500 & A501;
Caulking of anything that paints, prior to painting;
Clean, sand and prep all items prior to painting;
Block sealer;
Painting of gas piping;
Any necessary touch up painting required for steel;
Protection of adjacent work;
Protection of other work as necessary;
Clean-Up and Waste Disposal of Own Work (including any over-spray).

BP-14 Not Used

BP-15 LVP Flooring (FM52335)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
09 65 00 – Resilient Flooring

Work to Include, but not limited to the supply and installation of:

Rubber base;
Transitions to adjacent surfaces;
Floor preparation;
Moisture Mitigation for Own Work;
Protection of work after installation;
Clean-Up and Waste Disposal of Own Work.

BP-16 Specialty Items (FM52336)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
Division 10 - Specialties

Work to Include, but not limited to the supply and installation of:

Toilet Partitions;
Toilet Accessories;
Fire Extinguishers;
Signage;
Robe Hooks;
Layout of own work;
Corner Guards;
Clean-Up and Waste Disposal of Own Work.

BP-17 Fire Suppression (alternate bid item) (FM52337)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
Division 21 – Fire Suppression

Work to Include, but not limited to the supply and installation of:

Design;
Permit Approval and Fees;
Fire Water Connection and Line into Building (includes excavation, backfill and thrust blocks);
Structural Supports as needed for fire pump equipment;
Core drilling, saw cutting, grouting, caulking and fire stopping for own penetrations;
Protection of heads after install and removal of protection at substantial completion;
Fire Caulking of own work where required by code;
Commissioning and Start Up Reports;
Clean-Up and Waste Disposal of Own Work.

BP-18 Plumbing & HVAC (FM52338)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
Division 22 – Plumbing
Division 23 – Heating, Ventilating and Air Conditioning

Work to Include, but not limited to the supply and installation of:

Plumbing and Mechanical demolition;
Plumbing & Mechanical Permits and Fees;
Utilities to 5' Outside of Building;
Excavation and backfill of own work;
Spoil pile remove of own work;
Trench Drains;
Gas piping;
Compressed air;
Blocking for plumbing and mechanical items;
Seismic bracing per code requirements;
Core drilling, saw cutting, grouting, caulking and fire Stopping for own penetrations;
Roof curbs for mechanical equipment;
HVAC controls;
All Plumbing and Mechanical Fixtures;
Brine Maker;
Brine Tanks;
Brine Containment/Tank Piping System
Fire Caulking of own work where required by code;
Commissioning and Start Up Reports;
Test and Balancing. Provide Reports;
Vehicle Exhaust Control System (in coordination with Electrical);
Clean-Up of Own Work;

BP-19 Electrical (FM52339)

Contract Documents including all drawings and the following specifications:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
Division 26 – Electrical
Division 27 - Communications

Work to Include, but not limited to the supply and installation of:

Electrical Demolition;
Electrical Permits and Fees;
CM Trailer Hook-up;
Owner Trailer Hool-up;
Power for Temp Construction needs;
Coordination with Power Company for services needed;
All trenching, backfill conduits and concrete associated with new service;
Excavation and backfill of own work;
Removal of own spoil piles;
Core drilling, saw cutting, grouting, caulking and fire caulking for own penetrations;
Underground electrical conduits are to be placed under the slab gravel;
Brine Containment System Electrical including Brine Pumps, Control Stations, Control Panels, and VFDs;
Blocking for electrical items;
Seismic bracing per code requirements;
Fire Caulking of own work where required by code;
Low voltage wiring;
Commissioning of systems per Drawing Sheet E001 (or as otherwise noted);
Vehicle Exhaust Control System (in coordination with Mechanical);
Clean-Up of Own Work;

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SECTION 000070 – LICENSING OF PUBLIC WORKS CONTRACTORS NOTICE

NOTICE LICENSING OF PUBLIC WORKS CONTRACTORS STATE OF IDAHO

UNLAWFUL For any person to engage in the business or act in the capacity of a PUBLIC WORKS CONTRACTOR in the State of Idaho without a license.

PENALTIES Any person, firm, co-partnership, or corporation, acting as a PUBLIC WORKS CONTRACTOR without a license shall be guilty of a MISDEMEANOR.

EVERY PUBLIC OFFICER who knowingly lets a public contract to any person, firm, co-partnership, or corporation, who does not hold a license shall be guilty of a MISDEMEANOR.

EXCEPTION No contractor shall be required to have a license in order to submit a bid or proposal for contracts for public works FINANCED IN WHOLE OR IN PART BY FEDERAL AID FUNDS, but at or prior to the award and execution of any such contract by the State of Idaho, or other contracting authority, the successful bidder shall secure a license.

SUPPLY ONLY CONTRACTS Contractors whose scope of work is supply only are not required to have a public works license.

WHO MUST BE LICENSED "Public works contractors," – which is any "builder," or "specialty contractor," or any person who **offers to submit a proposal** or enter into a contract with the STATE OF IDAHO, or and COUNTY, CITY, TOWN, VILLAGE, SCHOOL DISTRICT, IRRIGATION DISTRICT, DRAINAGE DISTRICT, SEWER DISTRICT, FIRE DISTRICT, or any other taxing subdivision or district of the State, authorities to let or award contracts for the construction, repair or reconstruction of any public work.

PUBLIC WORK includes HEAVY, HIGHWAY, BUILDING and SPECIALTY construction.

EXEMPTION Any construction, alteration, improvement or repair involving an estimate cost of less than $10,000.

AUTHORITY - Title 54, Chapter 19, Idaho Code as amended, "THE PUBLIC WORKS CONTRACTORS LICENSE ACT."

DIVISION OF BUILDING SAFETY
PUBLIC WORKS CONTRACTORS LICENSING
1090 E Watertower Street, Suite 150
Meridian, ID 83642
Phone: 208-334-4057

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SECTION 000100 – INSTRUCTIONS TO BIDDERS

DEFINITIONS

The **Bidding Documents** comprise the **Project Documents** and shall consist of the plans, the contents of the specification books (including all documents referred to in the plans and specifications) and any addenda issued by the architect. The Bidding Requirements and the proposed Contract Documents are also included in the Project Documents.

Addenda are written or graphic documents issued by the Architect or Construction Manager prior to execution of the Contract which modify or interpret the Project Documents. The Addenda become part of the Contract Documents as noted in the Form or Agreement upon execution of the Contract.

Verbal Communications do not supersede the project documents. The project documents (plans, specifications, addenda) take precedence over verbal, email or other comments not included in addenda. If you feel a verbal comment made during a pre-bid meeting, phone call, etc. is important, it must be issued to the CM in RFI format and clarified in an official addendum.

A sample of the **Contract** is included in the project documents. Accepted bidder will be issued a contract that will include the Executed Bid Form as an attachment/exhibit to the Contract.

BIDDER'S REPRESENTATIONS

By submitting a bid, the bidder represents that:

1) Bidder has carefully studied and compared the Bidding Documents with each other. Bidder understands the Bidding Documents and the bid is fully in accordance with the requirements of those documents;
2) Bidder has thoroughly examined the site and buildings located thereon, has become familiar with local conditions which might directly or indirectly affect the contract work, and has correlated its personal observation with the requirements of the proposed Project Documents; and
3) Bidder fully understands the requirements identified in the Bid Form and understands that the Bid Form will be incorporated into the executed contract; and
4) Bid is based on the material, equipment, and systems required by the Bidding Documents without exception.

BIDDING DOCUMENTS

Copies of Bidding Documents in digital format shall be obtained from the Construction Manager as outlined in the Advertisement for Bids. Partial sets of Bidding Documents will not be issued.

Bidders shall use complete sets of Bidding Documents in preparing bids and make certain that those submitting sub-bids to them have access to all portions of the documents that pertain to the work covered by sub-bid, including General conditions, Special & Supplementary Conditions, and Division 00 & 01. Bidder assumes full responsibility for errors or misinterpretations resulting from use of partial sets of Bidding Documents by itself or any sub-bidder.

Interpretation or Correction of Bidding Documents

If any bidder, in his study of the Bidding Documents as described above, is in doubt as to the true meaning of any part of the proposed Contract Documents or finds errors, discrepancies, or omissions in them, he shall at once request interpretation or correction of those errors, discrepancies, and omissions as outlined in the Advertisement for Bids.

Bid the MOST EXPENSIVE option called for in the bidding documents. If there is a discrepancy between any documents (plans, specifications, addenda), you are to include the most expensive option. Also, you are welcome to submit any cost savings option as identified in the Bid Form Attachment section of this specification (see below).

Substitutions & Equal Products
Substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Documents requirements. The terms "Acceptable Manufacturers" and "approved Manufacturers/Supplies/Installers" are used throughout the Project Manual to differentiate among the options available to Contractor regarding specified products, manufacturers and suppliers.

Base bid only on material, equipment, systems, and suppliers specified in the Project Manual unless:
- Specified Material, equipment, or system is listed under the heading" acceptable Manufacturers, and
- Request for use of equal products is submitted in a properly complete Equal Product Approval Request Form for Architect's approval seven days minimum prior to bid opening, and
- Approval for use of such equal product is secured by Addendum issued prior to the scheduled bid opening time.

Addenda
Addenda will be posted no later than 48 hours prior to bid opening. No addenda will be issued less than 48 hours prior to bid opening.

BIDDING PROCEDURES
Bids shall be prepared on **Contractor Bid Form** shown in section 000300. A photocopy of the form bound in the Project Manual or a modified form included in an addendum is acceptable. Fill in all blanks on bid Form by typewriter or by printing manually in ink. Signatures shall be in longhand and executed by representative of bidder duly authorized to make contracts.

Bids shall bear no information other than that requested on Bid Form. Bid form shall bear no other marks, erasures writing changes or interlineations. Attachments shall not be included unless specifically required by a statement on the Bid Form or as addressed in the Bid Form Attachment section of this specification.

Bid Form Attachment
1) **Bidders are encouraged to provide "Value Engineering Options or Cost Saving Options (VE Options)" in addition to their base bid, on their own form as an attachment to the bid. ITD will take into consideration the attached VE items in evaluating subcontractor proposals for award. VE Options shall not be included in the Base Bid (Bid Form) numbers and will only be included and identified as an attachment to the Bid Form.**

Bid Bond
A Bid Bond in the amount of 5% of the total bid will be required as per the instructions identified in the Advertisement for Bids, Section 000030.

Performance & Payment Bond
It is not required of each bidder to provide a payment and performance bond at time of bid; however, each bidder must be capable of providing a payment and performance bond in the amount of 100% of the contract sum and will identify their Bond Rate/Amount on their Bid Form. The owner and reserves the right to elect some bidders to provide such bonding prior to contract award. The costs for a payment and performance bond will be incorporated into the notice of award and the contractor shall have 10 days from the notice of award to secure the bonding.

Failure or refusal to furnish bonds or insurance policies or certificates in a form satisfactory to the Owner shall subject the bidder to loss of time from the allowable construction period equal to the time of delay in furnishing the required material.

Insurances
Liability and Workers' Compensation Insurance shall be provided at time of award for the amounts identified in the contract. Contractor shall name Owner and CM as additional Insured.

Submission of Bids
Submit bid in accordance with Section 000030 Advertisement for Bids & 000300 Contractor Bid Form.

Modification Or Withdrawal of Bid
Bidder guarantees there shall be no revisions or withdrawal of bid amount for 45 days after bid opening.
Prior to bid opening, bidders may withdraw bid by written request or by reclaiming bid envelope.

Naming of Contractors
With regard to possessing an appropriate license or certificate of competency all contractors must have, at the time of the bid opening, a current license in the appropriate category (class, type and specialty category) as issued by the Public Works Contractors State License Board. In addition, plumbing and electrical subcontractors shall have, at the time of the bid opening, a valid plumbing contractor's license or electrical contractor's license, respectively as issued by the Idaho Division of Building Safety.

CONSIDERATION OF BIDS
Opening of bids – See Advertisement for Bids

Right to Accept or Reject - The Owner reserves the right to accept or reject any and all bids with or without cause, for any reason determined in its sole subjective determination to be in its best interest and to waive any informality in bidding.

Acceptance of Bid – No bidder shall consider itself under contract after opening and reading of bids until a Notice of Award has been issued and compliance therewith has been made.

The Owner does not discriminate on the basis of race, religion, sex, national origin, marital status, age, physical handicap, ownership by women or minorities or sexual orientation.

Bidders past performance, installer qualifications/certifications, organization, subcontractor's selection, equipment, and ability to perform and complete its contract in the manner and within time specified, together with amount of bid and VE items provided, will be elements considered in award of a contract.

FORM OF AGREEMENT BETWEEN CM/GC & SUBCONTRACTOR
Form to be used – Agreement form will be like the Owner's sample Form of Agreement included in project documents.

END OF SECTION 000100

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SECTION 000300 – CONTRACTOR BID FORM

Bid Proposal for:
D225080 - D5 MAINTENANCE BUILDING EXTENSION/RENOVATION
Idaho Transportation Department (ITD)
Blackfoot, Idaho

The Bidder, in compliance with the advertisement for bids for the above project, having examined the bidding and contract documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes all labor, equipment, materials and supplies, and to provide the service and insurance in accordance with the Contract Documents, within the time set forth, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents.

TIME SCHEDULE:

Bidder agrees to complete the work within the time schedule as established by the CM. Basic principles of the project schedule are as follows:

Milestone "Completed By" Dates:

Construction Start - 05/15/23.

Maintenance Building

a. Footings/Foundations – 06/16/23.
b. CMU Walls – 07/21/23.
c. Wood Framing – 07/28/23.
d. Roofing – 08/18/23.
e. Drywall – 09/08/23.
f. Contractors Complete – 10/20/23.
g. Punchlist/Training Complete – 10/20/23.
h. Substantial Completion/Turn-Over – 11/10/23.

Brine Building & Tank Containment Structure

i. Footings/Foundations – 07/07/23.
j. CMU Walls – 08/04/23.
k. Roofing – 08/18/23.
l. Contractors Complete – 09/22/23.
m. Punchlist/Training Complete – 09/29/23.
n. Substantial Completion/Turn-Over – 09/29/23.
o. Metal Canopy @ Tank Structure – 10/20/23.

By signing this bid form, bidder acknowledges the above milestone dates and agrees to accomplish their work on or before their respective milestone(s) and within the overall schedule in concert with other trades as directed by the CM.

Bidding Company Name: _____

This bid form applies to bid package number & title:
(a separate bid form for each bid package must be provided)

Bid Package No.	*Bid Package Title*

Bidder acknowledges receipt of the **Addenda No: _____.**
(List by Add. Number)

BASE PROPOSAL – Maintenance Facility: The complete Scope of Work for the Bid Package noted above (Idaho State sales tax is included), for the sum of:

($_____)_____

_____*Dollars*
(Amount shall be shown in both figures and words. In case of discrepancy, the amount in words will govern.)

- If a **Performance and Payment Bond** is requested for the above scope, please list the **Bonding Rate Percentage and dollars,** that would be applied to the base bid amount:

  Rate %_____ $_____

ALTERNATE No. 01 PROPOSAL – Add the Fire Suppression System, Fire Water Line & Riser, and Bay Wall Demolition: (Idaho State sales tax is included), for the sum of:

($_____)_____

_____*Dollars*
Amount shall be shown in both figures and words. In case of discrepancy, the amount in words will govern.)

ALTERNATE No. 02 – PROPOSAL – Addition of Brine Production Facility, Site Work, and Components: (Idaho State sales tax is included), for the sum of:

($_____)_____

_____*Dollars*
Amount shall be shown in both figures and words. In case of discrepancy, the amount in words will govern.)

ALTERNATE No. 03 – PROPOSAL – Addition Brine Tank Area Roofing and PEMB Structure: (Idaho State sales tax is included), for the sum of:

($_____)_____

_____*Dollars*

Amount shall be shown in both figures and words. In case of discrepancy, the amount in words will govern.)

For contractors bidding on more than one Bid Package a discount may be offered by your firm if both (or more) packages are accepted. Note the discount amount, as applicable, below. The Owner reserves the right to select the combination of separate bids, or a combination of bids with the discount, whichever results in the lowest bid.

List of Bid Packages to combine: _____

Discount, in dollars, if accepted in combination: **$_____**

Bidder understands that the Owner and/or the CM reserves the right to accept or reject any and all bids with or without cause, for any reason determined in its sole subjective determination to be in its best interest and to waive any informality in bidding.

The bidder agrees that this bid shall be good and may not be withdrawn for a period of forty-five (45) calendar days after the scheduled closing time for receiving bids (including alternate items).

The scope of each bid package must be bid in its entirety as a lump sum. Segregated bids will not be accepted. Any qualifications, exceptions, clarifications, or exclusions to one's bid may disqualify their proposal with exception of the Bid Form Attachment (VE Options items) identified in the Instructions to Bidders Spec Section and as below.

Bid Form Attachment - Bidders are encouraged to provide "Value Engineering Options or Cost Saving Options (VE Options)" in addition to their base bid, on their own form as an attachment to this bid form. ITD will take into consideration the attached VE items in evaluating subcontractor proposals for award. VE Options shall not be included in the Bid Form Base Proposal or Alternate/Optional Numbers and will only be included and identified as an attachment to this Bid Form.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract referenced within seven (7) days and deliver Insurance Certificates, P&P Bonds, and Special Condition Forms as required by the Bid Documents.

Additional Bidder Provisions

By submitting a bid for this Project, the undersigned bidder agrees that, if awarded, the Contractor will conform to all conditions and requirements of the Contract, Contract Documents and the following additional provisions:

95% Bona Fide Idaho Residents. Contractor agrees to comply with conditions pertaining to Sections 44-1001 and 44-1002, Idaho Code, requiring the employment of ninety-five percent (95%) bona fide Idaho residents and providing for a preference in the employment of bona fide Idaho residents and regarding the employment of persons not authorized to work in the United States.

Certification Concerning Boycott of Israel. Pursuant to Idaho Code section 67-2346, if payments under the Contract exceed one hundred thousand dollars ($100,000) and Contractor employs ten or more persons, Contractor certifies that it is not currently engaged in, and will not for the duration of the Contract engage in, a boycott of goods or services from Israel or territories under its control. The terms in this section defined in Idaho Code section 67-2346 shall have the meaning defined therein.

Debarment and Suspension. In submitting this bid proposal, we hereby certify that we have not been suspended or in any way excluded from procurement actions by any State Agency. We fully understand that if information contrary to this certification subsequently becomes available, such evidence may be grounds for non-award or nullification of a bid contract.

Anti-Collusion. In submitting this bid proposal, we hereby certify this proposal was developed and prepared without any collusion with any competing bidder or State employee. The content of this proposal has not been disclosed to any competing or potentially competing bidder prior to the proposal due date and time. Furthermore, no action to persuade any person, partnership or corporation to submit or withhold a bid has been made.

Equal Employment Opportunity. In submitting this bid proposal, you certify to the State that your company and the subcontractors you hire will comply with the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a), and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientations, gender identity or national origin. Moreover, these regulations required that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, protected veteran status or disability.

Domestic Procurement Preferences. In submitting this bid proposal and in accordance with 2 CFR §200.322 Domestic preferences, you certify to the District that your company will, as appropriate and to the extent consistent with law, provide preference for the purchase and use of goods, products or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products).

The names and addresses of the entities that will perform the work identified below, subject to approval of ITD, if Undersigned is awarded the Contract, are as follows:

Plumbing

(Name) _____

(Address) _____

Idaho Public Works Contractors License No. _____

Idaho Plumbing Contractors License No. _____

HVAC

(Name) _____

(Address) _____

Idaho Public Works Contractors License No. _____

Idaho HVAC Contractors License No. _____

Electrical

(Name) _____

(Address) _____

Idaho Public Works Contractors License No. _____

Idaho Electrical Contractors License No. _____

Failure to name a properly licensed contractor in each of the above categories may render the bid unresponsive and void. ***Please note that if the above trades do not apply to this bid package, empty lines should be noted as "Not Applicable" or "N/A".***

The State of Idaho policy prohibits purchase of asbestos products and asbestos containing materials for use in or on any facility, including personal and real property, where acceptable alternatives are available. The contractor certifies by submission of this bid proposal that the products or materials to be furnished as a result of this bid are free of asbestos and hazardous materials.

Execute as part of this bid form:

CONTRACTOR'S AFFIDAVIT
CONCERNING ALCOHOL AND DRUG-FREE WORKPLACE

STATE OF _____

COUNTY OF _____

Pursuant to the Section 72-1717, Idaho Code, I, the undersigned, being duly sworn, depose and certify that _____ is in compliance with the provisions of Section 72-1717, Idaho Code; that _____ provides a drug-free workplace program that complies with the provisions of Title 72, Chapter 17, Idaho Code, and will maintain such program throughout the life of a state construction contract; and that _____ shall subcontract Work only to subcontractors meeting the requirements of Section 72-1717(1)(a), Idaho Code.

_____
Name of Contractor

_____
Address

_____
City and State

By: _____
(Signature)

Subscribed and sworn to before me this _____ day of _____, _____.

_____
NOTARY PUBLIC
Residing at: _____

Commission expires: _____

FAILURE TO EXECUTE THIS AFFIDAVIT AND SUBMIT IT ALONG WITH YOUR BID SHALL MAKE YOUR BID NON-RESPONSIVE.

This Executed Bid Form shall be an attachment to the Contract. The Undersigned notifies that he is of this date duly licensed as an Idaho Public Works Contractor and further that he possesses the following as applicable:

Idaho **Public Works** License: _____ Exp. Date:_____

Idaho **Contractor Registration**: _____ Exp. Date:_____

Dated this _____ day of _____, _____.
(date) (month) (year)

Respectfully Submitted,

By: _____
(Company)

_____
(Business Address)

_____

_____
(Authorized Signature)

_____
(Printed Name & Title)

_____
(Email Address)

_____ _____
(Telephone) (Fax Number)

PLEASE NOTE:

- **All bids are to be submitted in a sealed properly labeled envelope**
- **No lines are to be left blank (NA or "Not Applicable" may be used to complete empty lines)**
- **Bid Bond included at a rate of 5% of the total bid**

END OF SECTION 000300

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SECTION 000600 – SPECIAL CONDITIONS

Table of Contents

1.0 Prime Contracts

1.1 Prime Contracts will be issued directly, by Idaho Transportation Department (ITD), for each of the Bid Packages identified in specification section 000031. ITD has retained a CM Agent (Bateman-Hall, Inc.) to help coordinate the management of the overall project.

1.2 Each Prime Contractor (Contractor) will be required to cooperate and coordinate with the CM and all other Contractors to perform their work in accordance with a Master Project Schedule developed, updated, and maintained by the CM.

2.0 Bid (Scope) Packages

2.1 The scope of each bid package must be bid in its entirety. Any qualifications, exceptions, clarifications, or exclusions to one's bid may disqualify their proposal with exception of the VE Options items identified on the Bid Form and in the Instructions to Bidders Spec Section 000100.

2.2 The scope of work in each bid package will become part of the bidder's contract. All Contractors will be accountable for the following requirements:

3.0 Site Access, Security, Rules & Regulations

3.1 All visitors sponsored by the Owner, Architect/ Engineer, CM, Contractor, Subcontractors, or Unions must check in with the CM and must follow all project rules and regulations. Each Contractor is to keep a strict attendance list of who is approved to be on site and when they are on site.

3.2 Any unauthorized personnel on site will be considered as a trespasser, and the appropriate authorities will be contacted. Unauthorized personnel are defined as any and all people not previously approved to be on site by the CM/ITD. Last Contractor on site each day is responsible for complete project lock-up.

3.3 A normal work week for this project will consist of a 40-hour Monday-Friday work schedule. Any time required by a contractor outside of a normal work week will require a 48-hour advanced notification. The CM Supervision required for work outside of the normal work week timeframe will be billed to the requesting contractor at a rate of $200/HR for each Supervisor necessary.

4.0 Temporary Services

4.1 Services provided by the Construction Manager will consist of the following: Temporary sanitary facilities, temporary power to central locations only, and dumpsters for miscellaneous construction debris only. Temporary general building lighting will be provided (under the Electrical Package) but trade specific task lighting will be by each contractor.

4.2 Large amounts of construction debris such as concrete, masonry block, demolition work, pallets, boxes, and other large packaging materials will be the contractor's responsibility to provide proper disposal of into their own containment systems whether on-site or off-site.

5.0 Material Handling, Parking & Scaffolding

5.1 All Contractors will be fully responsible for their own materials. This includes the off-loading, relocating, storage, protection, security, etc. For on-site storage, the CM's superintendent is to be notified prior to the arrival of all materials for coordination of the laydown area. All deliveries are to be coordinated in the CM Weekly Coordination meetings.

5.2 The CM and/or ITD is not responsible for unloading material. A $500/HR minimum fee will be back charged to all Contractors and/or Suppliers not performing their own unloading.

5.3 All off-site storage will need to be kept in a bonded and certified warehouse, inspected by the CM and/or owner and properly labeled prior to payment.

5.4 Parking areas are to be coordinated with the CM. Parking may be limited and the CM & Owner are not responsible for lost, damaged or stolen material, equipment, vehicles, etc.

5.5 Each Contractor is responsible to provide hoisting, vertical transportation, and scaffolding necessary to complete Contractor's work. Unless agreed to in writing, any hoisting, vertical transportation, or scaffolding is not to be shared.

6.0 Weather Protection (Heat & Cover)

6.1 Any heating, covering, and/or snow removal required to properly perform contracted work will be the responsibility of the Contractor. Bid accordingly as these costs are expected to be part of Contractor's bid for their own work for all exterior finishes.

6.2 Heating of the building once enclosed will be addressed by the CM.

7.0 Clean Up

7.1 Daily clean-up is a must for all Contractors. A clean project is a safe and productive site. All construction debris must be placed in garbage cans or dumpster at the end of each work day and areas where work was performed is to be cleared and swept.

7.2 Contractors that fail to keep up on their clean-up will be billed at a rate of $500/HR minimum fee to have this work completed for them by crews of the Construction Manager's choosing.

8.0 Safety

8.1 Each Contractor will be required to hold a weekly safety meeting with their own personnel and provide a copy of the meeting minutes to the CM's Superintendent. Each Contractor will be required to provide a copy of their safety manual to the CM's Superintendent, which will be maintained in the onsite job trailer. Each Contractor's Foreman will be required to attend a weekly safety meeting held by the CM's Superintendent.

8.2 The Contractor shall implement appropriate safety measures pertaining to their work and the project, including required training, documentation, certification, establishing safety rules, posting appropriate warnings and notices, erecting safety barriers, establishing proper notice procedures and implementing and maintaining a drug and alcohol-free workplace program to protect persons and property at the site and adjacent to the site from injury, loss, or damage.

8.3 The Contractor is required to designate an individual at the site in the employ of the Contractor who shall act as the Contractor's designated safety representative with a duty to prevent accidents. Unless otherwise identified by the Contractor in writing, the designated safety representative and the competent person for the work shall be Contractor's project foreman.

8.4 Before commencing work on the project, a **Job Hazard Analysis (JHA's)** will be required by all Contractors for their scopes of work. Each JHA will be turned into the CM's Superintendent and approved prior to the start of that scope of work. JHA's shall include, as a minimum, Contractors work activities, the hazards associated with the activities and how each activity hazards will be safely addressed in both PPE requirements and course of actions. Documented training forms shall accompany each JHA assuring that all personnel working have been trained for the associated hazards involved.

8.5 Contractors shall require all employees and sub tier employees to wear proper construction attire entailing hard hats and bright colored shirts or vests when on the job site, as a minimum.

8.6 Each Contractor will be required to provide MSDS (Material Safety Data Sheets) for all products that may be used for their work.

8.7 If hazardous substances of a type of which an employer is required by law to notify its employees are being used on the site by the Contractor, the Contractor's sub-subcontractors or anyone directly or indirectly employed by them, the Contractor shall, prior to harmful exposure of any employees on the site to such substance, give written notice of their hazardous communications plan as well as all MSDS pertaining to the project to the Contractor in sufficient detail and time to permit compliance with the law.

8.8 The Contractor shall give prompt written notice to the Contractor of:

8.8.1 any accident involving bodily injury requiring a physician's care,

8.8.2 any property damage exceeding Five Hundred Dollars ($500.00) in value, or

8.8.3 any failure that could have resulted in serious bodily injury, whether or not such an injury was sustained.

8.9 A detailed written report shall be furnished if requested by the CM.

8.10 Prevention of accidents at the site is the responsibility of all persons and entities at the site. Establishment of a safety program by the CM shall not relieve the Contractor or other parties of their

safety responsibilities. The Contractor shall establish its own safety program implementing safety measures, policies and standards conforming to those required or recommended by governmental and quasi-governmental authorities having jurisdiction and by the CM and Owner, including, but not limited to, requirements imposed by the Subcontract Documents.

8.11 The Contractor shall comply with the reasonable recommendations of insurance companies having an interest in the Project.

8.12 The Contractor shall stop any part of the contract work which the contractor deems unsafe until corrective measures satisfactory to the CM shall have been taken. The CM's failure to stop the Contractor's unsafe practices shall not relieve the Contractor of the responsibility therefor.

8.13 Contractor agrees to comply in all respects with federal, state and local law applicable to the prosecuting of Work under this Agreement, including such specific laws to which Contractor is bound by the Contract Documents. Such compliance shall include, but not be limited to, the maintenance of a drug-free and alcohol-free workplace as such laws and others may apply. Contractor's failure to comply with federal, state and local law applicable to the prosecution of Work under this Agreement shall be grounds for withholding of payment and/or termination for default of this Agreement. Compliance will be strictly enforced.

8.14 Use of telephones can be a distraction to the safe performance of the Work. Use of telephones for personal use – including mobile phones – is prohibited on the jobsite during work time.

8.15 Listening to music can be a distraction to the safe performance of the Work. Listening to music is prohibited on the jobsite during work time.

8.16 All traffic control; signage; barricading, etc. as required to perform work is the responsibility of the Contractor performing the work.

8.17 All Contractors are strongly encouraged to familiarize themselves with OSHA's Silica Dust Requirements. Compliance will be strictly enforced.

8.18 COVID-19 safe work requirements may be anticipated for this project. Current guidelines for safe work practices implemented by local, state, and federal jurisdictions will be followed and adhered to at the jobsite and may be subject to change as each of the aforementioned jurisdiction requirements change throughout the timeline of the project. Each Contract will be required to comply.

8.19 Any OSHA fines levied against the CM and/or the Owner as a result of a Contractor's actions or inactions will be treated as a deductive change order to that Contractor's contract amount.

9.0 Drug & Alcohol Policy

9.1 Drug and Alcohol Abuse at the job site will not be tolerated. Drug and Alcohol Abuse means being under the influence of illegal drugs and/or alcohol while at the job site; it also means being at the job site while in the possession of illegal drugs.

9.2 Workers who engage in Drug and Alcohol Abuse at the job site jeopardize the safety of themselves and other workers. Contractor shall be responsible for the investigation and, if necessary, discipline of its employee(s) who are suspected of Drug and Alcohol Abuse.

9.3 If a contractor foreman cannot be found, Contractor grants CM's superintendent with the authority to dismiss that worker from the site until Contractor's foreman is located and Contractor can conduct its investigation.

10.0 Storm Water Pollution Prevention

10.1 The Site Contractor will have primary responsibility to implement and maintain the storm water pollution prevention plan. However, each Contractor will also be held responsible to obey and abide by all EPA regulations and SWPPP specific for this project. Any damage by a Contractor to the installed protection systems will be the responsibility of the Contractor involved to correct or replace. Each Contractor will be required to attend a SWPPP pre-construction meeting and to sign a SWPPP certification form prior to working on site.

11.0 Supervision

11.1 Each Contractor is required to have a competent on-site Supervisor or Foreman approved by the CM's superintendent. The on-site Supervisor is to be present on-site for all work performed for the Contractor's bid package. This Supervisor must be able to competently address day-to-day issues and be in contact daily with the CM's Superintendent. Once approved, this person cannot be changed without prior approval from the CM's Superintendent.

12.0 Weekly Progress Meetings

12.1 All Contractors working on the site will be required to attend a weekly coordination meeting in the CM's on-site office. These meetings will be essential for scheduling day-to-day work activities and coordination with the other Contractors working on the project. Each weekly meeting will also discuss project safety and storm water pollution prevention.

13.0 Schedule

13.1 Time is of the essence for this project. All bids shall be based on the ability to meet the schedule, supply required material, manpower, supervision, and equipment and coordinate with other trades. Your bid proposal shall include any required or needed lead times and special durations for review. Any additional material, labor, supervision, equipment, coordination, and material escalation fees are to be included in bid. All additional costs to accelerate work, material deliveries, or equipment to meet the schedule shall be included in the bid.

13.2 Each Prime Contractor will be required to provide specified scheduling information necessary to maintain the Master Project Schedule and to meet the milestone completion dates as identified on the Bid Form and in each Prime Contract**.**

13.3 Further coordination and scheduling between Contractors, Suppliers and the CM is required to produce an acceptable schedule to the Owner. Contractor shall guarantee that they will meet all schedule objectives as stated on the bid form; in the master construction schedule; short term look-ahead schedules; coordination meetings; and other written notices.

13.4 The overall schedule of the project will be maintained and updated regularly in the CM's job site trailer. Schedules will not be sent out to individual Contractors. Project Milestone dates have been included on the Bid Form and are the primary basis for completion dates of selected aspects of the project. Sequencing of the project may be such that Contractors should anticipate multiple mobilizations for their scope of work.

13.5 Each Contractor will be required to keep up with the schedule, which will be discussed during each weekly progress meeting. Contractors that fall behind schedule will be required to take necessary and timely action to improve work progress as per the General Conditions. This action may require

increased work forces, extra equipment, extra shifts, or other actions. Should the Contractor refuse or neglect to take action, the CM may take necessary action at the Contractor's expense. No time extensions will be given for weather delays.

13.6 Contractors and Suppliers will be strongly encouraged to order materials upon submittal approval to avoid any delays in the supply chain. Coordinate onsite/offsite storage with the CM.

13.7 The owner reserves the right to assess Costs for Damage and/or Recovery to any or all Contractors' who are unable to maintain the project schedule.

13.8 Those that can't meet the project schedule should not bid this project.

14.0 Changes/Proposal Requests

14.1 The Scope of Work shall be subject to change by additions, deletions or revisions thereto by the Owner and/or CM. Contractor will be notified of such changes by receipt of additional and/or revised drawings, specifications, exhibits or other written notification.

14.2 If, upon receipt of any notification, Contractor considers that a change is involved that could affect its costs of performing the work or upon the schedule for performance of the work, Contractor is obligated to inform CM in a timely manner and within the timeframe stated within the Contract.

14.3 Contractor shall submit to CM within (5) working days after submission of the notification from CM a detailed takeoff with supporting calculations, documentation and pricing for the change, together with any requested adjustments in the schedule.

14.4 The pricing shall be itemized and shall be in enough detail to permit a detailed analysis of all labor, material and equipment and shall cover all work involved in the change whether such work was deleted, added or modified. Amounts related to subtier/vendor shall be supported in similar detail.

14.5 Lump Sum single price changes will not be accepted.

14.6 Acceptable detail will consist of the following single line items, as they apply to each item identified in the change, supported by the following clear and concise detailed cost information:

14.6.1 Direct Labor Costs
14.6.2 Direct Material & Equipment Costs
14.6.3 Rental Equipment/Subcontractor Owned Equipment Costs
14.6.4 Subtier/Vendor Costs
14.6.5 Subtotal of the Above
14.6.6 Idaho State Sales/Use Tax
14.6.7 Allowable Mark Ups
14.6.8 Total Proposal Cost

14.7 These items shall be summarized on a Contractor front cover letter to the CM for each change/proposal request. All changes shall be presented in round dollars with no cents.

15.0 Testing & Inspections

15.1 The Owner will retain the services of a Testing Agency to perform testing, special inspections, & document compliance for soils, concrete, and structural steel. Costs of corrective action or retesting due to unsatisfactory work will be the sole responsibility of the Contractor.

15.2 State and local required inspections, outside of the above, shall be by the Contractor. Results shall be forwarded to the CM upon receipt.

15.3 Front line inspections and quality control procedures remain the direct responsibility of each Contractor for their scope of work.

16.0 Permits & Licensing

16.1 The Owner will purchase the general building permit. All other permits & fees (state, local or other) will be the responsibility of the Contractors and are to be included in their proposals.

16.2 All Contractors will be required to have an Idaho Public Works Contractors License and Idaho Contractor's license prior to bidding this project.

17.0 Submittals, O&M Manuals, and As-Built Drawings

17.1 All submittals need to be submitted to the CM's office within 20 days after contract award. All Contractors will be required to e-mail submittals in a digital organized format. Faxed or disorganized submittals will not be accepted. Samples will need to be mailed to the B-H office.

17.2 O&M manuals are not to wait until project completion. These are to be submitted as early on in the project as possible. One hard copy and one digital copy will be required. Organization is a must. Warranties will need to be submitted with O&M manuals, and all warranty periods will not begin until substantial completion as noted in the documents.

17.3 Each Contractor is to maintain a set of as-built drawings for their scope of work. This will also need to be updated in the CM's on-site job trailer on a regular basis. The CM may ask to review a Contractor's as-builts at any time, and if found deficient, Contractor's payment may be held. Be sure to closely review the specifications for submittal and O&M requirements.

18.0 Taxes

18.1 All Contractors and Suppliers are responsible to pay **Idaho State sales tax**. Sales tax is to be included in their base bid proposal. No change orders will be given for sales tax.

18.2 The **Contractors Tax Affidavit** included in spec section 000816 will need to be completed as a close-out item prior to any release of retainage.

19.0 Survey & Layout

19.1 The CM shall provide and maintain well-built batter boards at the major building corners and shall establish and safeguard benchmarks in at least two widely separated places. As the work progresses, the CM will establish major building grids only as a guide for other trades.

19.2 All other surveying and layout shall be the responsibility of each Contractor. The cost to provide these services shall be included as part of each Contractor's base bid cost.

19.3 Contracts to specifically include these services (but are not limited to) are Earthwork, Potable Water Systems, Sanitary Sewage Systems, Fire Water Systems, Storm Sewage Systems and Irrigation Pipe, Asphalt Paving, Portland Cement Concrete Paving, Cast in Place Concrete, Unit Masonry Assemblies, Structural Steel, Framing, Gypsum Board Assemblies, Door and Window, Aluminum Entrances and Storefronts, Plumbing, Mechanical and Electrical subcontractors.

20.0 **Qualifications of Personnel**

20.1 Contractor shall be responsible for selecting personnel who are well qualified to perform the required Work.

20.2 All Contractor personnel entering the project shall conform to all security regulations and other regulations, rules and law which may be in effect during the period of this Agreement.

20.3 Contractor shall promptly comply with CM's and/or ITD's request to remove from the worksite any worker performing work on behalf of the Contractor who is found to be in violation of the terms of this Agreement.

20.4 At all times during the performance of this Agreement and until the Work is completed and accepted, Contractor shall directly supervise its work through a competent on-site foreman who is satisfactory to the CM and who has authority to act for the Contractor.

20.5 Subcontractor agrees that its on-site foreman shall continue to act as such until Contractor's work is complete and accepted and may not be removed from working on this project without the prior written consent of the CM.

20.6 Contractor agrees that failure of its on-site foreman to attend the weekly Superintendent Coordination Meeting and Safety Meeting will make it subject to the terms of default specified in this Agreement.

21.0 Warranty

21.1 Specific warranty requirements are covered in the specifications and contract documents. It noted here that all warranties will not start before the Substantial Completion Date. The Substantial Completion Date will be the starting point of warranties.

22.0 **Right of Joint-Check Payment**

22.1 ITD, at its option, may make any payment due by check payable jointly to Contractor and any of its Subcontractors or suppliers who have performed Work or furnished materials under this Agreement.

23.0 Slab Protection

23.1 No satisfactory chemical or cleaning procedure is available to remove petroleum stains from the concrete surface. Prevention is therefore essential. In addition to the food and drink requirements already noted in section 5.3 above, **It shall be the responsibility of all trades to protect the exposed floor slabs** by adhering to the following requirements:

23.1.1 Protect all slabs or finish surfaces from any and all damage. Protect any adjacent surfaces from any damage from work activities.

23.1.2 All hydraulic powered equipment must be diapered and have white non-marking tires to avoid staining of the concrete.

23.1.3 No trade will park vehicles on any inside slabs. If necessary, to complete their scope of work, drop cloths will be placed under vehicles at all times.

23.1.4 No pipe cutting machine will be used on any inside floor slabs.

23.1.5 Steel will not be place on interior slab to avoid rust staining.

23.1.6 Fire line testing (or any other waterline testing) will not be permitted directly onto any slabs or sidewalks.

24.0 ITD Facility Operations

24.1 The ITD Facility will remain in operation during the construction of this project. ITD will vacate the maintenance facility and use a temporary trailer located on the premises to conduct business from. ITD personnel will remain active with daily yard duties in and out of the facility and each Contractor is expected to work in harmony with ITD operations.

END OF SECTION 000600

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SECTION 000710 – EMPLOYMENT PRACTICES

GENERAL: Provisions of the Contract, including General and Special Conditions and other Division 0 Specification Sections, apply to this Section.

EQUAL EMPLOYMENT OPPORTUNITY: During the performance of this Contract each Subcontractor agrees as follows:

1) They will not discriminate against any employee or applicant for employment because of race, creed, color or national origin. They will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

2) Each Subcontractor will, in all solicitations or advertisements for employees placed by or on behalf of the Subcontractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color or national origin.

3) The Subcontractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other Contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the Subcontractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

4) The Subcontractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations and relevant orders of the Secretary of Labor.

5) The Subcontractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations and order of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and
orders.

6) In the event of the Subcontractor's noncompliance with the nondiscrimination clauses of this Contract, or with any of such rules, regulations, or orders, this Contract may be cancelled, terminated or suspended in whole or in part and the Subcontractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as Idaho Falls Event Center 000710 Employment Practices provided Executive Order No. 11246

of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor or as otherwise provided by law.

7) The Subcontractor will include the provisions of Paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Subcontractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided, however, that in the event the Subcontractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Subcontractor may request the United States to enter into such litigation to protect the interest of the United States.

END OF SECTION 000710

AIA® Document A132™ – 2019

Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

AGREEMENT made as of the **{Day}** day of **{Month}** in the year **{Year}**

BETWEEN the Owner:

State of Idaho Transportation Department
3311 W State Street
Boise, ID 83707
208-334-8000

and the Contractor:

{Contractor's Company Name}
{Physical Address}
{Physical City, State Zip}
{Office Phone}
{Email}

Contract Number: {State Contract No.}

for the following Project:

D5 Blackfoot Maintenance Extension & Renovation
Project Number: D225080
50 N 380 W
Blackfoot, ID 83221

The Construction Manager:

Bateman-Hall, Inc.
1405 Foote Drive
Idaho Falls, ID 83402
208-523-2681

The Architect:

Myers Anderson
122 South Main Street
Pocatello, ID 83204
208-232-3741

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions* Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A232™-2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™-2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™-2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser. AIA Document A232™-2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

TABLE OF ARTICLES

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

Commencement date is in accordance with Bid Form Milestone Schedule.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion of the Project or Portions Thereof

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the date of Substantial Completion of the Work of all of the Contractors for the Project will be:

Substantial Completion in accordance with Bid Form Milestone Schedule.

§ 3.4 When the Work of this Contract, or any Portion Thereof, is Substantially Complete

§ 3.4.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall substantially complete the entire Work of this Contract:

Substantial Completion in accordance with Bid Form Milestone Schedule.

§ 3.4.3 If the Contractor fails to substantially complete the Work of this Contract, or portions thereof, as provided in this Section 3.4, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:
(Check the appropriate box.)

- ☒ Stipulated Sum, in accordance with Section 4.2 below
- ☐ Cost of the Work plus the Contractor's Fee, in accordance with Section 4.3 below
- ☐ Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below.)

§ 4.2 Stipulated Sum

§ 4.2.1 The Contract Sum shall be **{Written Price}** **(${Contract Price})**, subject to additions and deductions as provided in the Contract Documents.

§ 4.2.2 Alternates

§ 4.2.2.1 Alternates, if any, included in the Contract Sum:

{Accepted Alternates}

[Paragraph Deleted]

§ 4.2.3 Allowances, if any, included in the Contract Sum:

{Allowances}

§ 4.2.4 Unit prices, if any:

{Unit Prices}

§ 4.3 Cost of the Work Plus Contractor's Fee without a Guaranteed Maximum Price

[Section Deleted due to this being a Stipulated Sum Contract]

§ 4.4 Cost of the Work Plus Contractor's Fee with a Guaranteed Maximum Price

[Section Deleted due to this being a Stipulated Sum Contract]

§ 4.5 Liquidated damages, if any:

Liquidated Damages are in accordance with the Special Conditions of this contract.

§ 4.6 Other:

[Section Deleted]

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and Certificates for Payment issued by the Construction Manager and Architect, the Owner shall make progress payments

on account of the Contract Sum, to the Contractor, as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month. Unless otherwise agreed, payments for services shall be made monthly in proportion to services performed. Idaho Transportation Department will render payment for a properly executed invoice according to Idaho Code 67-2302 from the date of the invoice for pay items accepted by Idaho Transportation Department.

§ 5.1.3 Applications for Payment are due to the Construction Manager not later than the 20th day of a month. The Owner shall make payment of the certified amount in the Application for Payment to the Contractor according to Idaho Code 67-2302.

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment

§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.4.3 In accordance with AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.4.3.1 The amount of each progress payment shall first include:

.1 That portion of the Contract Sum properly allocable to completed Work;

.2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.4.3.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019; and

.5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.5 Progress Payments Where the Contract Sum is Based on the Cost of the Work without a GMP

[Section Deleted due to this being a Stipulated Sum Contract]

§ 5.1.6 Progress Payments Where the Contract Sum is Based on the Cost of the Work with a GMP

[Section Deleted due to this being a Stipulated Sum Contract]

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

Retainage will be Five Percent (5%) for Work completed and material suitably stored. Contractor agrees to withhold no more than Five Percent (5%) from its lower tier subcontractors and suppliers.

§ 5.1.7.1.1 The following items are not subject to retainage:

NA

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

No reduction in retainage will be allowed prior to final completion without written approval of the Owner.

[Paragraph Deleted]

§ 5.2 Final Payment

§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum

§ 5.2.1.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for payment or Project Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner after the issuance of the final Certificate for Payment or Project Certificate for Payment, pursuant to the provision of Idaho Code 67-2302.

§ 5.2.1.2 The Owner's final payment to the Contractor shall be made according to Idaho Code 67-2302.

§ 5.2.2 Final Payment Where the Contract Sum is Based on the Cost of the Work with or without a GMP

[Section Deleted due to this being a Stipulated Sum Contract]

§ 5.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due according to Idaho Code 67-2302

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document A232–2019, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

§ 6.2 Binding Dispute Resolution

[Section Deleted]

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2019.

§ 7.1.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor a termination fee as follows:

The Contractor shall be compensated for any and all costs to date and equitable OH&P for the scope of work completed prior to termination.

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019

§ 7.2 Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price

[Section Deleted due to this being a Stipulated Sum Contract]

§ 7.3 Suspension

The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019; in such case, the Contract Sum and Contract Time shall be increased as provided in Article 14 of AIA Document A232–2019, except that the term "profit" shall be understood to mean the Contractor's Fee as described in Section 4.3.2 or 4.4.2, as applicable, of this Agreement.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2019 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:

Tony Pirc
ITD Facility Program Mgr.
PO Box 11
Boise, ID 83707
208-334-8000
tony.pirc@itd.idaho.gov

§ 8.3 The Contractor's representative:

TBD

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A132™–2019, Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

Distribution of electronic documents (Submittals, Modifications, Project Payment Documents, Plans, Specifications, etc.) will be through a combination of Construction Manager's collaboration website/program and electronic mail. No free-of-charge hard copy sets of Drawings and/or Project Manuals will be provided to Contractors.

§ 8.7 Relationship of the Parties

[Section Deleted due to this being a Stipulated Sum Contract]

§ 8.8 Other provisions:

§ 8.8.1 The work shall strictly comply with all federal, state, local and municipal laws, rules, regulations, statutes, ordinances and other directives (hereinafter referred to as "Laws"), applicable to the Work on the Project, including, but not limited to, labor, wage, equal opportunity employment, environmental and safety Laws. All work, in addition to that specifically required by this Contract but necessary to fully comply with such Laws, will be furnished by

Contractor as part of this Contract without additional compensation. In the event Contractor observes any work on the Project, which Contractor believes is not in compliance with such Laws, Contractor shall immediately notify Owner and Construction Manager in writing of such non-compliance.

§ 8.8.2 Contractor agrees not to assign or sublet Contract or the Work or any right to payment or other Contract right or portion of the Work without the prior written consent of the Owner and Construction Manager.

§ 8.8.3 Contractor hereby certifies that it has an established safety policy as required by the Occupational, Safety and Health Administration (OSHA), which requires regular safety meetings. Contractor agrees to conduct or attend weekly safety meetings regarding its Work under this agreement and shall promptly prepare minutes of such meetings and provide copies of such minutes to Contractor as the Work progresses. Contractor agrees to comply with all requirements of OSHA relating to the Work and shall maintain and provide all applicable material safety data sheets and safety manuals in accordance with OSHA requirements.

§ 8.8.4 All materials delivered by or on account of Contractor and intended to be incorporated into the Project shall become property of the Owner when delivered to the Work Site, but Contractor may repossess himself of any surplus remaining at the completion of the Work of this Contract. All scaffolding, apparatus, tools, equipment, machinery and plans brought onto the Work Site by the

§ 8.8.5 Non-violent union picketing shall not constitute a justified delay in the Project on the part of the Contractor.

§ 8.8.6 If either party shall file suit against the other, and arising out of this Contract, the prevailing party shall be entitled to recover a reasonable sum for attorney fees and costs from the other party, including costs and fees on any appeal. In addition, in the event Owner is required to defend any action arising out of or relating to Contractor's obligation hereunder, including any suite, arbitration or other legal proceeding, Contractor shall pay Owner its reasonable costs and attorney fees.

§ 8.8.7 The Owner through the Construction Manager may require notarized lien releases from Contractor and its subcontractors and suppliers, or may issue joint checks at Construction Manager's sole discretion at any time. As a condition for any progress payment or final payment, the Construction Manager may require the Contractor to provide the names and addresses of all of its employees, subcontractors and suppliers providing any labor and/or material for any portion of the Work and shall provide evidence of payment of employee withholding taxes.

§ 8.8.8 Quality Control and Supervision of the Work

§ 8.8.8.1 Continuous control of the quality of the Work is the essence of this Contract. Failure of the Contractor to establish and maintain quality control of the Work shall be a default of this agreement. Contractor shall establish a quality control program satisfactory to the Construction Manager to assure the proper execution of the Work in accordance with this agreement and the Prime Contract.

§ 8.8.8.2 The Work shall be administered and directed by Contractor's project supervisor experienced in the Work and acceptable to Construction Manager who shall be assigned to the Project upon execution of this agreement. Contractor's project supervisor shall be present on site at all times Work is performed or materials delivered and Contractor shall not change project supervisors during the Project without Construction Manager's consent. Failure to maintain proper supervision on site shall constitute default of this agreement.

§ 8.8.8.3 Contractor shall be responsible for the continuous quality control of the Work, protection of the Work and other work at the site and for cleanup and maintenance of the site of the Work. Construction Manager may, at any time, require removal and replacement of Contractor's project supervisor and Contractor shall be liable for any costs, including overhead costs, incurred by Construction Manager in assuring or maintaining quality control of the Work.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

.2 AIA Document A132™–2019, Exhibit A, Insurance and Bonds Exhibit

.3 AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

NA

.5 Drawings

Number	Title	Date
{X.XX}	{Sheet Name 1}	{Sheet Date 1}
{X.XX}	{Sheet Name 2}	{Sheet Date 2}

.6 Specifications

Section	Title	Date
{XX XX XX}	{Spec Name 1}	{Spec Date 1}
{XX XX XX}	{Spec Name 2}	{Spec Date 2}

.7 Addenda, if any:

{Addenda & Dates}

[Paragraph Deleted]

.8 Other Exhibits: *[Subsection Information Deleted]*

.9 Other documents, if any, listed below:

-Contractor's Executed Bid Form
-Contractor's Executed Performance & Payment Bonds

This Agreement entered into as of the day and year first written above.

State of Idaho Transportation Department	{Contractor's Company Name}
(Signature)	*(Signature)*
(Printed name and title)	*(Printed name and title)*

AIA® Document A132™ – 2019 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the **{Day}** day of **{Month}** in the year **{Year}.**
(In words, indicate day, month and year.)

for the following PROJECT:
(Name and location or address)

D5 Blackfoot Maintenance Extension & Renovation
Project Number: D225080
50 N 380 W
Blackfoot, ID 83221

THE OWNER:
(Name, legal status and address)

State of Idaho Transportation Department
11331 W Chinden Blvd
Boise, ID 83714
208-334-8000

THE CONTRACTOR:
(Name, legal status, and address)

{Contractor's Company Name}
{Physical Address}
{Physical City, State Zip}
{Office Phone}
{Email}

Contract Number: {State Contract No.}

TABLE OF ARTICLES

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions* Report that notes added information as well as revision to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A232™-2019, General Conditions of the Contract for Construction, Article 11 of A232™-2019 contains additional insurance provisions.

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A232™–2019, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

§ A.2.3 Required Property Insurance

§ A.2.3.1 The Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

[Paragraph Deleted]

[Paragraph Deleted]

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.
[Section Deleted Due To Inapplicability]

§ A.2.5 Other Optional Insurance.
[Section Deleted Due To Inapplicability]

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect and the Architect's consultants, and the Construction Manager and the Construction Manager's consultants, as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, and the Construction Manager and the Construction Manager's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2.

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than **One Million Dollars** (**$1,000,000.00**) each occurrence, **Two Million Dollars** (**$2,000,000.00**) general aggregate, and **Two Million Dollars** (**$2,000,000.00**) aggregate for products-completed operations hazard, providing coverage for claims including

.1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
.2 personal injury and advertising injury;
.3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
.4 bodily injury or property damage arising out of completed operations; and
.5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

.1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.

.2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
.3 Claims for bodily injury other than to employees of the insured.
.4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
.5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
.6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
.7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
.8 Claims related to roofing, if the Work involves roofing.
.9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
.10 Claims related to earth subsidence or movement, where the Work involves such hazards.
.11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than **One Million Dollars** (**$1,000,000.00**) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than **One Million Dollars** (**$1,000,000.00**) each accident, **One Million Dollars** (**$1,000,000.00**) each employee, and **One Million Dollars** (**$1,000,000.00**) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than **One Million Dollars** (**$1,000,000.00**) per claim and **One Million Dollars** (**$1,000,000.00**) in the aggregate.

[Paragraph Deleted]

[Paragraph Deleted]

[Paragraph Deleted]

[Paragraph Deleted]

§ A.3.3 Contractor's Other Insurance Coverage
[Section Deleted Due To Inapplicability]

§ A.3.4 Performance Bond and Payment Bond
The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:

(Specify type and penal sum of bonds.)

Type	Penal Sum ($0.00)
Payment Bond	100% of Contract Value
Performance Bond	100% of Contract Value

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

NA

CONTRACT PACKAGE

PROJECT-SPECIFIC

INSURANCE INFORMATION

TO BE SHOWN HERE

CONTRACT PACKAGE

PROJECT-SPECIFIC

SAMPLE INSURANCE FORM

TO BE SHOWN HERE

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AIA® Document A232® – 2019

General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

for the following PROJECT:
(Name, and location or address)

D5 Blackfoot Maintenance Building Extension & Renovation
50 N 380 W
Blackfoot, ID 83221

THE CONSTRUCTION MANAGER:
(Name, legal status, and address)

Bateman-Hall, Inc.
1405 Foote Drive
Idaho Falls, ID 83402

THE OWNER:
(Name, legal status, and address)

State of Idaho Transportation Department
11331 W Chinden Blvd.
Boise, ID 83714

THE ARCHITECT:
(Name, legal status, and address)

Myers Anderson
122 South Main Street
Pocatello, ID 83204

TABLE OF ARTICLES

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

11 INSURANCE AND BONDS

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 Contractors. Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 Separate Contractors. Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 The Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.8 The Specifications. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.9 Instruments of Service. Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.10 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and 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 any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building

Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work, and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 The Owner shall retain a construction manager adviser lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.6 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.7 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3.8 The Owner shall forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to review by the Construction Manager and prior approval of the Architect, and the Construction Manager or Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.5, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner, the Construction Manager, and the Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent

for the completed construction. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require

additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager, or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information, and the Construction Manager's use in developing the Project schedule, a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Construction Manager, Architect, and Owner, and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data, and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

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

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed

in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been reviewed and approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Construction Manager and Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner, the Architect, and the Construction Manager shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with

information given and the design concept expressed in the Contract Documents. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Construction Manager and Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager, and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager, and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner, Architect, or Construction Manager. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is

attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

§ 4.1.3 Duties, responsibilities, and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Construction Manager, Architect, and Contractor. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents and defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of, or be responsible for acts or omissions of, the

Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications. The Owner shall communicate with the Contractor and the Construction Manager's consultants through the Construction Manager about matters arising out of or relating to the Contract Documents. The Owner and Construction Manager shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Construction Manager otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with other Contractors shall be through the Construction Manager. Communications by and with the Owner's own forces and Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents, and will notify each other about the rejection. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.11 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or of any

construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.13 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.15 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.16 The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.17 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.18 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of the Construction Manager, Owner, or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.19 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions so rendered in good faith.

§ 4.2.20 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Contractors or Separate Contractors or the subcontractors of other Contractors or Separate Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager and Architect, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, 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 terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, that the Contractor, by these Contract Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Separate Contractors, Construction Manager and other Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces, Separate Contractors or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor or other Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's or other Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractors or other Contractors that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces, Separate Contractors, or other Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction, or to property of the Owner, Separate Contractors, or other Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner, Separate Contractors, and other Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, other Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor. A Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Construction Manager and Architect;
.2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
.5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Construction Manager and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Construction Manager that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner, Architect, Construction Manager, or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts and the Architect, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Construction Manager, before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Construction Manager and the Architect. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner, Construction Manager or

Architect require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in

Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment or, in the case of more than one Contractor, a Project Application and Certificate for Payment, shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment or, in the case of more than one Contractor, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.6 The issuance of a Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.3 and 9.4.4 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.2. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

.1 defective Work not remedied;
.2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
.3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
.5 damage to the Owner or a Separate Contractor or other Contractor;
.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
.7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager, and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Construction Manager and Architect or awarded

by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute, a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. 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.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a notice that the Work is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager shall perform an inspection to confirm the completion of Work of the Contractor. The Construction Manager shall make recommendations to the Architect when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect, who will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

.1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
.2 failure of the Work to comply with the requirements of the Contract Documents;
.3 terms of special warranties required by the Contract Documents; or
.4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

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

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor;

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and

.4 construction or operations by the Owner, Separate Contractors, or other Contractors.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

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

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any 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 the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's 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, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner, Construction Manager and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or

insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Construction Manager and Construction Manager's consultants, and the Architect and Architect's consultants, shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice directly to the Owner, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform both the Contractor and the Construction Manager, separately and in writing, prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice directly to the Contractor, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor, Architect, and Construction Manager for loss of use of the Owner's property, due to fire or other hazards however caused.

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Construction Manager, Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Construction Manager, Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Construction Manager or Architect has not specifically requested to examine prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion, and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner, Construction Manager or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Separate Contractors, or other Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the 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 the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Construction Manager, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Construction Manager, Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;

.3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

.4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees, or any other persons performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, after consultation with the Construction Manager, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without

prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims
The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims
§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance
§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time
§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties, the Construction Manager, and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days of receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

Additions and Deletions Report for

AIA® Document A232® – 2019

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 08:18:53 MT on 02/03/2023.

PAGE 1

D5 Blackfoot Maintenance Building Extension & Renovation
50 N 380 W
Blackfoot, ID 83221

...

Bateman-Hall, Inc.
1405 Foote Drive
Idaho Falls, ID 83402

...

State of Idaho Transportation Department
11331 W Chinden Blvd.
Boise, ID 83714

...

Myers Anderson
122 South Main Street
Pocatello, ID 83204

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Vanessa Josephson, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 08:18:53 MT on 02/03/2023 under Order No. 2114329920 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A232™ - 2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

Vanessa Josephson

(Signed)

Project Manager

(Title)

February 3, 2023

(Dated)

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D5 Blackfoot Maintenance Extension & Renovation *(D225080)*
Owner: State of Idaho Transportation Department
11331 W Chinden Blvd
Boise, ID 83714

CONTRACTOR'S AFFIDAVIT CONCERNING TAXES

STATE OF _____)

COUNTY OF _____)

Pursuant to the Idaho Code Title 63, Chapter 15, I the undersigned, being duly sworn, depose and certify that all taxes, excises, and license fees due to the State or its taxing units, for which I or my property is liable then due or delinquent, has been paid, or arrangements have been made, before entering into a contract for construction of any public works in the State of Idaho.

{Contractor's Company Name} - *{State Contract No.}*
Name of Contractor

{Mailing Address}
Address

{Mailing City, State Zip}
City and State *SEAL*

By: _____
(Signature)

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

_____
NOTARY PUBLIC
Residing at: _____

Commission Expires: _____

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Idaho State Tax Commission
CONTRACTOR'S REQUEST FOR TAX RELEASE

Date: _____

PART I -- AWARDING AGENCY INFORMATION:			
Name of agency	Mailing address	City, State, & Zip	
State of Idaho Transportation Department	**11331 W Chinden Blvd**	**Boise, ID 83714**	
Contact name	Phone number	Email address	
Travis Frei, Contracting Officer	**208-334-8622**	**Travis.Frei@itd.idaho.gov**	

PART II -- CONTRACTOR INFORMATION:			
Name of contractor	Mailing address	City, State, & Zip	
{Contractor's Company Name}	**{Mailing Address}**	**{Mailing City, State Zip}**	
Federal EIN	Contact name	Phone number	Email address
		{Office Phone}	**{Email}**

PART III -- CONSTRUCTION/CONTRACT MANAGER INFORMATION (if applicable):			
Name of business	Mailing address	City, State, & Zip	
Bateman-Hall, Inc.	**PO Box 1464**	**Idaho Falls, ID 83402**	
Federal EIN	Contact name	Phone number	Email address
82-0328277	**Patti Cole, Compliance Officer**	**208-523-2681**	**Patti.Cole@bateman-hall.com**

Send a copy of the Approved Tax Release to: ☒Awarding Agency ☒Contractor ☒Construction Manager

NOTE: *We will email all copies unless otherwise requested*

PART IV – PROJECT INFORMATION	
Name of project	Location of project
D5 Blackfoot Maintenance Extension & Renovation	**50 N 380 W Blackfoot, ID 83221**

Description of Project

Renovation of existing office space and expansion of shop space to accommodate larger equipment at ITD District 5's Blackfoot facility. Add alternate of brine making facility expansion & relocation onsite.

Project number assigned by awarding agency	Project start date	Project completion date	Final/closing contract amount (includes all change orders)
D225080			**$**

Did any government entities supply materials which were installed by this contractor or its subs? ☐Yes ☐No

If YES, list these materials and their dollar values. (Attach additional information if needed)

List Materials	List Dollar Values of Materials
	$
	$
	$
	$

Send to: Contract Desk/Sales Tax Audit
Idaho State Tax Commission
PO Box 36
Boise, ID 83722-0410

Phone: (208) 334-7618
Fax: (208) 332-6619
Email: **contractdesk@tax.idaho.gov**

D5 Blackfoot Maintenance Extension & Renovation *(D225080)*
Owner: State of Idaho Transportation Department
11331 W Chinden Blvd
Boise, ID 83714

RELEASE OF CLAIMS

(TO BE COMPLETED FOR FINAL PAYMENT)

I, _____do hereby release the State of Idaho from any and all claims of any character whatsoever arising under and by virtue of contract number **{State Contract No.}** dated **{Month} {Day}, {Year}** as amended, except as herein stated.

{Contractor's Company Name} - *{State Contract No.}*
Name of Contractor

By: _____
(Signature)

_____
Date

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CONDITIONS PRECEDENT TO FINAL PAYMENT

Contractor: **{Contractor's Company Name} - *{State Contract No.}***

ITD Project No. **D225080**

Project Title: **D5 Blackfoot Maintenance Extension & Renovation**

Location: **50 N 380 W Blackfoot, ID 83221**

Send to:

State of Idaho
Idaho Transportation Department
11331 W Chinden Blvd
Boise, ID 83714

Copy to:

Bateman-Hall, Inc.
Attn: Patti Cole
PO Box 1464
Idaho Falls, ID 83403
or
1405 Foote Dr.
Idaho Falls, ID 83402

Contractor's Responsibilities:

As a condition precedent to final payment, the Contractor must furnish the owner, in the form and manner required by Owner, to be submitted to the Construction Manager for approval, the following:

- ☐ Contractor's Final Request for Payment Form has been provided;
- ☐ Release of Claims form has been provided;
- ☐ Contractor's Affidavit of Payment of Debts and Claims Form has been provided (AIA G706);
- ☐ Consent of Surety to Final Payment has been provided (AIA G707);
- ☐ Confirmation of all required training (DPW's Training Confirmation Form), product warranties, operating manuals, instruction manuals, and other record documents, drawings and items customarily required of the Contractor has been provided.
- ☐ Public Works Contract Tax Release from the Idaho Tax Commission has been provided;
- ☐ ITD's Letter of Completion/Final Inspection Sign-Off (as required);
- ☐ Project Finalization and Start Up has been provided (as required)

Contractor's Signature Date

Construction Manager's Approval for Payment:

- ☐ All Warranties, Guarantees, etc. have been received, approved, and have been provided.
- ☐ Contractor's As-Built Drawings have been received, reviewed, approved.
- ☐ Final punch list with AE's verification that all items have been completed.
- ☐ Record Drawings have been completed by AE. All required copies of the Record Documents and electronic media area attached and signed off as complete.

To the best of my knowledge, information, and belief, and on the basis of my observations and inspections, I certify the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the required documentation required by Paragraph 7.13 of the fixed priced contract has been received. The entire balance, as shown on the attached Final Request for Payment, is due and payable.

Construction Manager's Signature Date

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Technical Specifications

DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Fixed Price Construction Contract and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Work covered by Contract Documents.
2. Work by Owner.
3. Work under separate contracts.
4. Owner-furnished products.
5. Contractor-furnished, Owner-installed products.
6. Access to site.
7. Coordination with occupants.
8. Work restrictions.
9. Permits.
10. Waste Disposal.
11. Testing and Inspection.
12. Specification and drawing conventions.

B. Related Requirements:
1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:
1. The project scope entails an addition or enlargement to the existing maintenance building. The existing building consists of six vehicle repair bays, office and meeting spaces, two restrooms and an existing mezzanine above the office area (only). Renovations are scheduled for the garage bays and the restroom plumbing fixtures are scheduled to be replaced. Refer to the full drawings and specifications for demolition vs new construction information. Also, part of this project is a separate building for brine production and brine tank storage. Refer to Section 01 23 00 “Alternates” for full scope of base bid vs add alternate.

1.4 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Items noted NIC (Not in Contract), will be furnished and installed by the Owner/Agency.

1.5 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

1.6 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project, and by use of facility by building tenants in existing tenant improvement Projects.

B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
   1. Limits: Confine construction operations to the areas of work indicated on and in the drawings and specifications.
   2. Driveways, Walkways and Entrances: Keep driveways loading areas, etc. and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
      a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
      b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
      c. Contractor parking shall be limited to those areas indicated on the Contract Document and as designed by the Owner.
      d. Maintain clear access to project at all times for firefighting equipment. Maintain exit ways from existing building required by authorities having jurisdiction.
      e. Signs: Provide signs adequate to direct visitors.
         1) Do not install, or allow to be installed, signs other than specified sign(s) and signs identifying the principal entities involved in the project.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Any damage to the building, due to negligence on behalf of the contractor to not maintain a weather-tight condition, shall be the responsibility of contractors and they shall bear the burden for correction and/or repairs for any damage. Repair damage caused by construction operations.

D. Security: The contractor shall maintain security of the building and any staging areas throughout the project.

1.7 COORDINATION WITH OCCUPANTS

A. Full Owner Occupancy: Owner will occupy site and existing building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.
3. The Owner will take special care not to damage materials or work completed by the contractor prior to final acceptance. If the contractor occurs any damages, prior to final acceptance, they need to notify the Owner and Architect immediately for verification of damages. If the contractor fails to notify the Owner and Architect within 24 hours of the incident, the contractor shall be responsible for the performance and shall bear the cost of correction.

1.8 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.
   1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, unless otherwise indicated.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
   1. Notify Owner not less than 3 days in advance of proposed utility interruptions.
   2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
   1. Notify Owner not less than 2 days in advance of proposed disruptive operations.

E. Hazardous Materials: Notify the Design Professional and Owner immediately upon discovery of existing hazardous materials.

F. Nonsmoking Building: Smoking is not permitted within the building or on Idaho Transportation Department property.

G. Controlled Substances: Use of tobacco products and other controlled substances is not permitted per Section 72-1717, Idaho Code.

H. Contractor Parking: Coordinate with Idaho Transportation Department for Contractor parking.

I. On Owner/Tenant occupied projects, maintain cleanliness in areas adjacent to and surrounding the construction area to the satisfaction of the Owner at all times.

J. On Owner/Tenant occupied projects, ensure deliveries and contractor work access are in accordance with previous agreement with Owner and/or as indicated in the Contract Documents.

1.9 PERMITS

A. Furnish all necessary permits for construction of the Work.

1.10 WASTE DISPOSAL

A. The contractor is responsible for any and all demolition and/or removal as necessary and required to fulfill the requirements of the Contract Documents.

1.11 TESTING AND INSPECTION

A. Notify Owner/Engineer at least 24 hours prior to commencement of Work requiring special inspection.

1.12 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
   1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
   2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
   3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
   1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
   2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

   1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

   2. Additive Alternates should be kept to a minimum and must be clear, precise and independent of other additive alternates.

B. Execute accepted alternates under the same conditions as other work of the Contract.

C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Fire Suppression System, Fire Water Line and Riser, and Bay Wall Demolition

1. Base Bid: All work associated with construction of the building including site grading as described on and in the drawings and specifications. Base bid includes keeping the existing CMU divider wall and new extension wall at the addition area. Base bid excludes all work associated with providing a fire suppression system, fire riser, and full demolition of the existing CMU divider wall between Bay C and Bay D. Fire suppression system is for the maintenance building only and to include the entire first floor (existing and new) and the mezzanine.

1. Add Alternate: All work associated with providing a fire suppression system (NFPA 13), fire riser, and full demolition of the existing CMU divider wall between Bay C & Bay D and no new extension wall type (W6C) at the addition. Coordinate with electrical and mechanical drawings to relocate new or existing items where indicated on CMU wall scheduled for demolition. See demolition sheets and information. Coordinate with structural drawings for information and directives for ADD ALT. Fire suppression system is for the maintenance building only and is to include the entire first floor (existing and new) and the mezzanine. Contractor is to provide fire suppression drawings for approval by the state fire marshal and in coordination with project architect and consultants.

B. Alternate No. 2: Brine Production Facility, Site Work, and Components
   1. Base Bid: Excludes all work and site work associated with the construction for the Brine Production Facility, including brine building materials, building location site work, utilities to the brine facility, brine production units and components, brine tank area slab, stem walls, concrete piers, and brine tank piping.

   2. Add Alternate: All work associated with construction of the Brine Production Facility including site grading as described on and in the drawings and specifications. Including Brine Production Facility building materials, location site work, utilities, brine production units and components, brine tank area slab, stem walls, concrete piers and tank piping (Six brine tanks by Owner). Brine production unit(s) basis of design is the Varitech Brine Boss with automated touchscreen-controlled unit paired with the Salt Brine Production unit (stainless steel). Any/all substitutions shall be reviewed for approval at time of bidding. Brine storage tanks are provided by owner (ITD). Contractor is responsible for the piping and plumbing of these tanks. Brine Production slab and concrete stem wall are to receive Sikagard 705L. The Brine Tank Area slab and stem walls to receive Sikagard 705L. Any/all substitutions for Sikagard 705L shall be reviewed for approval at time of bidding. Coordinate with structural, electrical, mechanical, and plumbing drawings for ADD ALT info / directives.

C. Alternate No. 3: Brine Tank Area Roofing and PEMB Structure
   1. Base Bid: Excludes all work associated with the Brine Facility (PEMB) pre-engineered metal building package with roofing and all accessories. Concrete piers for columns and associated footings for columns are part of ADD ALT #2. Plumbing / piping for brine tanks are part of ADD ALT #2.

   2. Add Alternate: All work associated with the construction of the Brine Facility roof and structure over the brine tanks as described on and in the drawings and specifications. Including the (PEMB) pre-engineered metal building package with metal roofing and all roofing trim / accessories. Coordinate with structural, electrical, mechanical, and plumbing drawings for ADD ALT info / directives.

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:
   1. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
   1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
   2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit electronic copy of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
      b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
      c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
      d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
      e. Samples, where applicable or requested.
      f. Certificates and qualification data, where applicable or requested.
      g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
      h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.

i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
   a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
   b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.6 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
   1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
      a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
      b. Substitution request is fully documented and properly submitted.
      c. Requested substitution will not adversely affect Contractor's construction schedule.
      d. Requested substitution has received necessary approvals of authorities having jurisdiction.

e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Fixed Price Construction Contract and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue through contractor supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time on AIA Document G710, "Architect's Supplemental Instructions".

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
   1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
   2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      c. Include costs of labor and supervision directly attributable to the change.
      d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
      e. Quotation Form: Use forms acceptable to Architect.

B. Contractor-Initiated Work Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Work Change Proposal Request Form: Use form acceptable to Architect.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 01 21 00 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

B. Unit-Price Adjustment: See Section 01 22 00 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, the Architect will complete the Owner’s Change Order Form and attach the Proposal Request and back-up. The Architect will then forward this documentation to the Owner’s Project Manager who will create a Change Order for approval of the Owner and Contractor.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Owner’s Representative may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

   1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

A. Submit printed schedule on AIA G703 - Continuation Sheet for G702 Contractor's standard form or electronic media printout will be considered for this use.

B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement

C. Format: Use Table of Contents of this Project Manual
   1. Identify each line item with number and title of major Specification Section
   2. Identify line item for site mobilization, bonds and insurance, and project closeout.
   3. Include the following Project identification of the Schedule of Values:
      a. Project name and location
      b. Name of General Contractor
      c. Name of Architect
      d. Owner’s project number
      e. Date of submittal.
   4. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
      a. Related Specification Section or Division
      b. Description of the Work
      c. Change Orders (numbers) that affect value.
      d. Dollar value
   5. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluations of Applications of Payment and progress reports.
   6. Coordinate with the Project Manual table of contents.
   7. Provide several line items for principal subcontract amounts, where appropriate
   8. Round amounts to nearest whole dollar; total shall equal the Contract.
   9. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not installed.
      a. Differentiate between items stored on-site and items stored off-site.
      b. Include evidence of insurance or bonded warehousing if required.
   10. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
   11. Each item in the Schedule of Values and Applications for Payment shall be complete.

a. Include total cost and proportionate share of general overhead and profit for each item.
b. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

D. Include within each line item, direct proportional amount of Contractor's overhead and profit.

E. Revise schedule to list approved Change Orders with each Application for Payment

1.2 APPLICATION FOR PAYMENT

A. Submit one copies of each Application for Payment on AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702

B. Content and Format: Use Schedule of Values for listing items in Application for Payment

C. Complete every entry on form.
1. Execute by a person authorized to sign legal documents on behalf of Contractor.
2. Architect will return incomplete applications without action.
3. Entries shall match data on the Schedule of Values.
4. Include amounts of Change Orders approved before last day of construction period covered by application.

D. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

E. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor
1. The period of construction work covered by each Application of Payment is the period indicated in the Agreement.

F. Administrative actions and submittals that must precede or coincide with submittal of first Application of Payment include the following:
1. List of subcontractors (if applicable)
2. Schedule of Values
3. Submittals Schedule (preliminary if not final).
4. List of Contractor's staff assignments
5. Copies of permits (if applicable)
6. Copies of authorizations and licenses form authorities having jurisdiction for performance of the Work.
7. Initial progress report

G. Submit with transmittal letter as specified for Submittals in Section 01 33 00 - Submittal Procedures
1. One signed original copy of Application for Payment to the Architect

H. Submit updated construction schedule with each Application for Payment

I. After issuing the Certificate of Substantial Completion, submit an Application of Payment showing 95 percent completion of portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

J. Submit final Application for Payment showing 100 percent completion with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
    1. As-Built Drawings
    2. Operation and Maintenance Manual
    3. All Warranties and Guarantees
    4. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
    5. AIA Document G706, “Contractor’s Affidavit of Payment of Debts and Claims”
    6. AIA Document G707, “Consent of Surety to Final Payment”
    7. Letter stating all punch list items are completed and accepted.
    8. Release of Claims form
    9. Project Finalization and Start-Up Form

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Fixed Price Construction Contract and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General coordination procedures.
   2. Coordination drawings.
   3. RFIs.
   4. Digital project management procedures.
   5. Project meetings.

B. Related Requirements:
   1. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.3 DEFINITIONS

A. BIM: Building Information Modeling.

B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Key Personnel Names: Within seven (7) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

   1. Post copies of list in project meeting room, in temporary field office. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of Contractor's construction schedule.
   2. Preparation of the schedule of values.
   3. Installation and removal of temporary facilities and controls.
   4. Processing of submittals.
   5. Progress meetings.
   6. Preinstallation conferences.
   7. Project closeout activities.
   8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
   1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
      a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
      b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
      c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
      d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
      e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
      f. Indicate required installation sequences.
      g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance

requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:
   1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
   2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
   3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
   4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
   5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
   6. Mechanical and Plumbing Work: Show the following:
      a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
      b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
      c. Fire-rated enclosures around ductwork.
   7. Electrical Work: Show the following:
      a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
      b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
      c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
      d. Location of pull boxes and junction boxes, dimensioned from column center lines.
   8. Fire-Protection System: Show the following:
      a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
   9. Review: Design Professional will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Design Professional determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Design Professional will so inform Contractor, who shall make changes as directed and resubmit.
   10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 "Submittal Procedures."
   11. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility.

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
   1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
   2. File Submittal Format: Submit or post coordination drawing files using PDF format.
   3. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
      a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
      b. Digital Data Software Program: Drawings are available in AutoCad 2013.
      c. Contractor shall execute a data licensing agreement in the form of Agreement included in this Project Manual.

1.7 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI.
   1. Design Professional will approve RFIs with any comments.
   2. Design Professional shall notify Owner of the Design Professional's Representative who will receive and respond to RFIs.
   3. Contractor shall submit RFIs in a prompt manner so as to avoid delays in the work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
   1. RFI subject.
   2. Specification Section number and title and related paragraphs, as appropriate.
   3. Drawing number and detail references, as appropriate.
   4. Field dimensions and conditions, as appropriate.
   5. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
   6. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven (7) working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
   1. The following Contractor-generated RFIs will be returned without action:
      a. Requests for approval of submittals.
      b. Requests for approval of substitutions.
      c. Requests for approval of Contractor's means and methods.
      d. Requests for coordination information already indicated in the Contract Documents.
      e. Requests for adjustments in the Contract Time or the Contract Sum.
      f. Requests for interpretation of Architect's actions on submittals.
      g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor's proposed change order according to Section 01 26 00 "Contract Modification Procedures".
    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within seven (7) days of receipt of the RFI response.

D. On receipt of Architect's action: Review response and notify Architect within seven (7) days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Architect's Data Files Not Available: Architect will provide Architect's CAD drawing digital data files for Contractor's use during construction.

B. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Digital Drawing Software Program: Contract Drawings are available in AutoCad 2013.
4. Contractor shall execute a data licensing agreement in the form of Agreement included in Project Manual.
    a. Subcontractors, and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement included in this Project Manual.
5. At Contractor's written request, copies of Architect's Electronic CAD files will be provided to Contractor for Contractor's use in connection with the Project, subject to the following conditions:
    a. Electronic CAD Files of Project Drawings may only be used to expedite production of Shop Drawings for the Project. Use for other Projects or purposes is not allowed.
    b. The drawings cannot be used for any other project.
    c. The Architect's title block must be removed by the Contractor. The Contractor becomes responsible for the content of the drawings.
        1) User is responsible for removing information not normally provided on Shop Drawings and removing references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.
    d. Use of files is solely at receiver's risk. Architect does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Documents. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Architect of discrepancy and use information in hard-copy Drawings and Specifications.

1) CAD files may not necessarily represent the latest Contract Documents, existing conditions, and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.
2) Receiver shall not hold Architect/Engineer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.
3) Receiver shall understand that even though Architect/Engineer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media.
4) Receiver shall not hold Architect/Engineer responsible for such viruses or their consequences, and shall hold Architect/Engineer harmless against costs, losses, or damage caused by presence of computer virus in files or media.

C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 PROJECT MEETINGS

A. General: The Design Professional will schedule and conduct meetings and conferences at Project site unless otherwise indicated.

B. Preconstruction Conference: The Owner will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect.
1. Minutes: The Design Professional will be responsible for the meeting minutes and will record and distribute to all parties.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Owner of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Sustainable design requirements.

i. Review of mockups.
j. Possible conflicts.
k. Compatibility requirements.
l. Time schedules.
m. Weather limitations.
n. Manufacturer's written instructions.
o. Warranty requirements.
p. Compatibility of materials.
q. Acceptability of substrates.
r. Temporary facilities and controls.
s. Space and access limitations.
t. Regulations of authorities having jurisdiction.
u. Testing and inspecting requirements.
v. Installation procedures.
w. Coordination with other work.
x. Required performance results.
y. Protection of adjacent work.
z. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: The Design Professional will conduct progress meetings at monthly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Agency, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
1) Review schedule for next period.
b. Review present and future needs of each entity present, including the following:
1) Interface requirements.
2) Sequence of operations.
3) Resolution of BIM component conflicts.
4) Status of submittals.
5) Status of sustainable design documentation.
6) Deliveries.

7) Off-site fabrication.
8) Access.
9) Site use.
10) Temporary facilities and controls.
11) Progress cleaning.
12) Quality and work standards.
13) Status of correction of deficient items.
14) Field observations.
15) Status of RFIs.
16) Status of Proposal Requests.
17) Pending changes.
18) Status of Change Orders.
19) As-Built Updates.
20) Pending claims and disputes.
21) Documentation of information for payment requests.

4. Minutes: Design Professional responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
   a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

1.2 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1.3 SUBMITTAL PROCEDURES

A. All submittals will be submitted to the Construction Manager for review. Construction Manager will then transmit the submittal to the architect for approval.

B. Transmit each submittal with AIA G810 - Transmittal Letter or Contractor similar form.

C. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.

D. Place a permanent label or title block on each submittal for identification.
   1. Indicate name of firm or entity that prepared each submittal on label or title block.
   2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
   3. Include the following information on label for processing and recording action taken:
      a. Project name
      b. Owner's Project Number
      c. Date
      d. Name and address of Architect
      e. Name and address of Contractor
      f. Name and address of subcontractor, if any
      g. Name and address of supplier
      h. Name and address of Manufacturer
      i. Unique identifier, including revision number
      j. Number and title of appropriate Specification Section
      k. Drawing number and detail references, as appropriate

l. Other necessary identification

E. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents

F. Transmit each package with transmittal form individually and appropriately for transmittal and handling.
   1. On an attached separate sheet, prepared on Contractor’s letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations.
      a. Include the same label information as the related submittal.
   2. Include Contractor’s certification stating that information submitted complies with requirements of the Contract Documents
   3. Provide locations on transmittal form for the following information.
      a. Project Name
      b. Owner’s Project Number
      c. Date
      d. Destination (To :)
      e. Source (From :)
      f. Names of subcontractor, manufacturer, and supplier
      g. Category and type of submittal
      h. Submittal purpose and description
      i. Submittal and transmittal distribution record
      j. Remarks
      k. Signature of transmitter

G. Schedule submittals to expedite Project and deliver to Architect at business address. Coordinate submission of related items
   1. For each submittal for review, allow 10 days excluding delivery time to and from Contractor.

H. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.

I. Allow space on submittals for Contractor and Architect review stamps.

J. When revised for resubmission, identify changes made since previous submission.

K. Distribute copies of reviewed submittals as appropriate
   1. Instruct parties to promptly report inability to comply with requirements.

L. Submittals not requested will not be recognized nor processed.

M. Complete submittals for each item are required.

N. Incomplete Submittals:
   1. Architect/Engineer will not review.
   2. Delays resulting from incomplete submittals are not the responsibility of Architect.

O. Architect will not review submittal:
   1. Received from sources other than General Contractor
   2. Without General Contractor’s reviewed stamp
   3. Without a completed transmittal form
   4. Instruct parties to promptly report inability to comply with requirements.

P. Use only final submittals with mark indicating action taken by Architect in connection with construction.

1.2 ELECTRONIC SUBMITTAL PROCEDURES

A. At Contractor’s written request, the use of electronic submittals may be approved by the architect.

B. All submittals will be submitted to the Construction Manager for review. Construction Manager will then transmit the submittal to the architect for approval. Submit each submittal in PDF format.

C. Transmit each submittal with electronic equivalent of AIA Form G810
   1. Allow space on submittals for Contractor’s review and approval markings.
   2. Allow space on submittals for Contractor and Architect/Engineer review stamps.
   3. Include the following information for processing and recording action:
      a. Name and address of General Contractor
      b. Project name
      c. Owner’s/Architects Project Number
      d. Date
      e. Name and address of Architect
      f. Name and address of Contractor
      g. Name and address of subcontractor, if any
      h. Name and address of supplier
      i. Name and address of Manufacturer
      j. Unique identifier, including revision number
      k. Number and title of appropriate Specification Section
      l. Drawing number and detail references, as appropriate
      m. Other necessary identification
      n. Indicate name of firm or entity that prepared each submittal.

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.

E. Transmit each package with transmittal form individually and appropriately for transmittal and handling.

F. Complete submittals for each item are required.

G. Incomplete Submittals:
   1. Architect/Engineer will not review.
   2. Delays resulting from incomplete submittals are not the responsibility of Architect.

H. Use only final submittals with mark indicating action taken by Architect in connection with construction.

I. Architect will not review submittal:
   1. Received from sources other than General Contractor
   2. Without General Contractor’s reviewed stamp
   3. Without a completed transmittal form
   4. Not in PDF format

J. Schedule submittals to expedite Project and deliver to Architect at business address. Coordinate submission of related items

1. For each submittal for review, allow 10 days.

K. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.

L. When revised for resubmission, identify changes made since previous submission.

M. Distribute copies of reviewed submittals as appropriate
1. Instruct parties to promptly report inability to comply with requirements.

N. Submittals not requested will not be recognized or processed.

O. Use only final submittals with mark indicating action taken by Architect in connection with construction.

P. Electronic submittals shall comply with the same requirements contain elsewhere in this section for paper submittals.

1.4 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
   a. Manufacturer's catalog cuts.
   b. Manufacturer's product specifications.
   c. Standard color charts.
   d. Statement of compliance with specified referenced standards.
   e. Testing by recognized testing agency.
   f. Application of testing agency labels and seals.
   g. Notation of coordination requirements.
   h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:
   a. Wiring diagrams that show factory-installed wiring.
   b. Printed performance curves.
   c. Operational range diagrams.
   d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
   a. Project name and submittal number.
   b. Generic description of Sample.
   c. Product name and name of manufacturer.
   d. Sample source.
   e. Number and title of applicable Specification Section.
   f. Specification paragraph number and generic name of each item.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Number of Samples: Submit two (2) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
   a. Number of Samples: Submit three (3) sets of Samples. Architect will retain one sample set; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is

installed in its final location, for compliance with requirements in the Contract Documents.

3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.5 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.6 ARCHITECT'S REVIEW

A. Do not make "mass submittals" to Architect
1. "Mass submittals" are defined as six or more submittals or items in one day or 15 or more submittals or items in one week
2. If "mass submittals" are received, Architect's review time stated above will be extended as necessary to perform proper review
3. Architect will review "mass submittals" based on priority determined by Architect after consultation with Owner and Contractor

B. Architect will review each submittal, make marks to indicate corrections or modifications required, and return it.

1. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

C. Informational submittals and other similar data are for Architect information, do not require Architect responsive action, and will not be reviewed or returned with comment.

D. Submittals made by Contractor that are not required by Contract Documents will not be reviewed and may be discarded.

E. Submittals approval does not authorize change to Contract requirements unless accompanied by Change Order or Architect's Supplemental Instructions.

F. Architect will review submittals twice.
   1. All additional reviews shall be paid for by the Contractor at an established fee.
   2. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Fixed Price Construction Contract and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-assurance and quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality-assurance and -control services required by Design Professional, or Owner, or authorities having jurisdiction are not limited by provisions of this Section.
   4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by the Design Professional.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

   1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.

2. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Design Professional for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Design Professional for a decision before proceeding.

1.5 ACTION SUBMITTALS

A. Shop Drawings: For mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.
   1. Indicate manufacturer and model number of individual components.
   2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
   1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Design Professional.
   2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Design Professional.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
   1. Specification Section number and title.
   2. Entity responsible for performing tests and inspections.
   3. Description of test and inspection.
   4. Identification of applicable standards.
   5. Identification of test and inspection methods.
   6. Number of tests and inspections required.
   7. Time schedule or time span for tests and inspections.
   8. Requirements for obtaining samples.
   9. Unique characteristics of each quality-control service.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 15 days of Notice to Proceed and not less than 2 days prior to preconstruction conference. Submit in format acceptable to Design Professional. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
   1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
   1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
   2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
   3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Design Professional has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
   1. Date of issue.
   2. Project title and number.
   3. Name, address, and telephone number of testing agency.
   4. Dates and locations of samples and tests or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the Work and test and inspection method.
   7. Identification of product and Specification Section.
   8. Complete test or inspection data.
   9. Test and inspection results and an interpretation of test results.
   10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
   11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
   12. Name and signature of laboratory inspector.
   13. Recommendations on retesting and re-inspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
   1. Name, address, and telephone number of technical representative making report.
   2. Statement on condition of substrates and their acceptability for installation of product.
   3. Statement that products at Project site comply with requirements.
   4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.9 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
   a. Provide test specimens representative of proposed products and construction.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
   d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
   e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
   f. When testing is complete, remove test specimens, assemblies, and mock-ups; do not reuse products on Project unless authorized by the Design Professional.
2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Design Professional and Commissioning Authority with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.10 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services. These services, or special inspections, provided to the Owner are for the express purpose of meeting the testing requirements required under the authorities having jurisdiction and shall not in any way be considered to replace the Contractor’s responsibility for quality assurance and control for the project.
1. Contractor will coordinate and schedule all testing and special inspections with the Owner’s testing agency.
2. Under no circumstances will the Owner’s testing agency perform quality control or quality assurance work for the Contractor.

3. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor**,** and the Contract Sum will be adjusted by Change Order.
4. Initial reports (handwritten as a minimum) will be given to the Contractor by the Owner's testing Agency before leaving the site the day of the inspection.
5. Final reports will be issued later to the Contractor, Design Professional, and Owner.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
   a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Owner, Design Professional, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Owner, Design Professional, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service to Owner, Design Professional, and Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.

6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
   1. Access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
   4. Facilities for storage and field curing of test samples.
   5. Delivery of samples to testing agencies.
   6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
   7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
   1. Distribution: Distribute schedule to Owner, Design Professional, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner as follows:
   1. Schedule of Special Inspections by Owner: See individual specification sections for specific requirements.

B. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
   1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
   2. Notifying Owner, Design Professional, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
   3. Submitting a certified written report of each test, inspection, and similar quality-control service to Owner, Design Professional, and Contractor, and to authorities having jurisdiction if required.
   4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
   5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
   6. Retesting and re-inspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Architect.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Owner and Design Professional’s reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:
   1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Agency will pay sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: Agency will pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Agency will pay electric-power-service use charges for electricity used by all entities for construction operations.

E. Water and Sewer Service from Existing System: Water from Agency's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

D. Moisture-and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.
   1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
   2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
   3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
   1. Locations of dust-control partitions at each phase of work.
   2. HVAC system isolation schematic drawing.
   3. Location of proposed air-filtration system discharge.
   4. Waste-handling procedures.
   5. Other dust-control measures.
   6. Noise control measures.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
   1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
   2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
   3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction.

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
   1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.
   1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures or facilities.
   1. Toilets: Use of Owner's existing toilet facilities may be permitted, if authorized, as long as facilities are cleaned and maintained in a condition acceptable to the Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
   1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
   1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
      a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
      b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
   2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
   3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
   1. Install electric power service overhead unless otherwise indicated.

H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
   1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.4 SUPPORT FACILITIES INSTALLATION

A. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

B. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution."

D. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

E. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

F. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

D. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

E. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.

1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
3. Provide walk-off mats at each entrance through temporary partition.

F. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.

2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

3.7 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 01 25 00 "Substitution Procedures" for requests for substitutions.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within seven (7) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

    a. Form of Architect's Approval of Submittal: As specified in Section 01 33 00 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.

4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: …"

2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: …"

3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

    a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: …"

4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.

    a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: …"

5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

    a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"

6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.

    a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: …"

7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.

Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
4. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 73 00

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

B. Related Requirements:

1. Section 01 10 00 "Summary" for limits on use of Project site.
2. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.2 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
   a. Water, moisture, or vapor barriers.
   b. Membranes and flashings.
   c. Exterior curtain-wall construction.

d. Sprayed fire-resistive material.
e. Equipment supports.
f. Piping, ductwork, vessels, and equipment.
g. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
   a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
6. Dates: Indicate on the contractor’s schedule when cutting and patching will be performed.

B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

C. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of in occupied spaces and in unoccupied spaces, or as required by authorities having jurisdiction.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Remove and replace damaged, defective, or non-conforming Work.

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
   a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
   b. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
   a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 AGENCY-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner’s and Agency construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner and Agency construction personnel.
1. Construction Schedule: Inform Owner/Agency of Contractor's preferred construction schedule for Owner/Agency portion of the Work. Adjust construction

schedule based on a mutually agreeable timetable. Notify Owner/Agency in a timely manner if changes to schedule are required due to differences in actual construction progress.

2. Preinstallation Conferences: Include Owner/Agency construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner/Agency work. Attend preinstallation conferences conducted by Owner/Agency construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
   1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
   2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
      a. Use containers intended for holding waste materials of type to be stored.
   4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls.”

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including Fixed Price Construction Contract and other Division 01 Specification Sections, apply to this Section.

B. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures.
   2. Final completion procedures.
   3. Warranties.
   4. Final cleaning.
   5. Repair of the Work.

C. Related Requirements:
   1. Section 01 78 23 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
   2. Section 01 79 00 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at final completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Idaho Division of Public Works Close-Out requirements. The “Project Finalization” form is required unless specifications indicate otherwise.

1.4 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of seven (7) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
   3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
   4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
   5. Submit sustainable design submittals not previously submitted.
   6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
   7. A final report of Special Inspections to be attached to the Substantial Completion. If no Special Inspections are required, Design Professional can initial as such on the Substantial Completion form.
   8. Submit O&M Manuals for compliance with the contract documents.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of seven (7) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Advise Owner of pending insurance changeover requirements.
   2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
   3. Complete startup and testing of systems and equipment.
   4. Perform preventive maintenance on equipment used prior to Substantial Completion.
   5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
   6. Advise Owner of changeover in utility services.
   7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
   8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
   9. Complete final cleaning requirements.
   10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.5 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
   1. Submit final Application for Payment according to Section 01 29 00 "Payment Procedures".
   2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   3. Idaho Division of Public Works Close-Out requirements.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will approve/initial punch list after inspection or will notify Contractor of construction that must be completed or corrected before final documents will be signed.

1.6 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
   1. Organize list of spaces in sequential order.
   2. Retain the subparagraph below if default submittal format in Section 01 33 00 "Submittal Procedures" is not appropriate.
   3. Submit list of incomplete items in the following format:
      a. MS Excel electronic file. Architect will return annotated file.
      b. PDF electronic file. Architect will return annotated file.

1.7 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within ten (10) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
   1. Submit on digital media acceptable to Architect.

E. Warranties in Paper Form:
   1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
   2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
   3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
   4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

F. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
   1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
      a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
q. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations, as well as any damage to surrounding areas. Repair includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition before requesting inspection for determination of Substantial Completion.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

B. Repair, or remove and replace, defective construction.

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
   1. Operation and maintenance documentation directory manuals.
   2. Emergency manuals.
   3. Systems and equipment operation manuals.
   4. Systems and equipment maintenance manuals.
   5. Product maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
   1. Architect and Agency will comment on whether content of operation and maintenance submittals is acceptable.
   2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:
   1. Submit on digital media acceptable to Architect.
   2. Submit three paper copies. Architect will return two copies.

C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 7 (seven) days before commencing demonstration and training. Architect will return copy with comments.
   1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

D. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.3 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
   1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.

2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
   1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
   2. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
      a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
      b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.4 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
   1. Title page.
   2. Table of contents.
   3. Manual contents.

B. Title Page: Include the following information:
   1. Subject matter included in manual.
   2. Name and address of Project.
   3. Name and address of Owner.
   4. Date of submittal.
   5. Name and contact information for Contractor.
   6. Name and contact information for Construction Manager.
   7. Name and contact information for Architect.
   8. Name and contact information for Commissioning Authority.
   9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
   10. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.5 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:
   1. Type of emergency.
   2. Emergency instructions.
   3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
   1. Fire.
   2. Flood.
   3. Gas leak.
   4. Water leak.
   5. Power failure.
   6. Water outage.
   7. System, subsystem, or equipment failure.
   8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:
   1. Instructions on stopping.
   2. Shutdown instructions for each type of emergency.
   3. Operating instructions for conditions outside normal operating limits.
   4. Required sequences for electric or electronic systems.
   5. Special operating instructions and procedures.

1.6 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
   1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
   2. Performance and design criteria if Contractor has delegated design responsibility.
   3. Operating standards.
   4. Operating procedures.
   5. Operating logs.
   6. Wiring diagrams.
   7. Control diagrams.
   8. Piped system diagrams.
   9. Precautions against improper use.
   10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:
   1. Product name and model number. Use designations for products indicated on Contract Documents.
   2. Manufacturer's name.
   3. Equipment identification with serial number of each component.
   4. Equipment function.
   5. Operating characteristics.
   6. Limiting conditions.
   7. Performance curves.
   8. Engineering data and tests.
   9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:
   1. Startup procedures.
   2. Equipment or system break-in procedures.
   3. Routine and normal operating instructions.
   4. Regulation and control procedures.
   5. Instructions on stopping.
   6. Normal shutdown instructions.
   7. Seasonal and weekend operating instructions.
   8. Required sequences for electric or electronic systems.
   9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds, as described below.

C. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
   1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
      a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
   2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
   3. Identification and nomenclature of parts and components.
   4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
   1. Test and inspection instructions.
   2. Troubleshooting guide.
   3. Precautions against improper maintenance.
   4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   5. Aligning, adjusting, and checking instructions.
   6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
   1. Include procedures to follow and required notifications for warranty claims.

H. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1.8 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Product Information: Include the following, as applicable:
   1. Product name and model number.
   2. Manufacturer's name.
   3. Color, pattern, and texture.
   4. Material and chemical composition.
   5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
   1. Inspection procedures.
   2. Types of cleaning agents to be used and methods of cleaning.
   3. List of cleaning agents and methods of cleaning detrimental to product.
   4. Schedule for routine cleaning and maintenance.
   5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
   1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:
   1. Record Drawings.
   2. Record Specifications.
   3. Record Product Data.

B. Related Requirements:
   1. Section 01 73 00 "Execution" for final property survey.
   2. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of Copies: Submit one set(s) of marked-up record prints.
   2. Number of Copies: Submit copies of record Drawings as follows:
      a. Initial Submittal:
         1) Submit one paper-copy set(s) of marked-up record prints.
         2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
      b. Final Submittal:
         1) Submit one paper-copy set of marked-up record prints.
         2) Architect will review for completeness.

B. Record Specifications: Submit one paper copy annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one paper copy annotated PDF electronic files and directories of each submittal.
   1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

1.3 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper or electronic copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
   1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:
a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Construction Change Directive.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Format: DWG, Version , Microsoft Windows operating system.
3. Format: Annotated PDF electronic file with comment function enabled.
4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
5. Refer instances of uncertainty to Architect for resolution.
6. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
a. See Section 01 31 00 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
b. Architect will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. If required, bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.

3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:
    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Architect.
    e. Name of Contractor.

1.4 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
    1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
    2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
    3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
    4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
    5. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as paper copy or scanned PDF electronic file(s) of marked-up paper copy of Specifications.

1.5 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
    1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
    2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
    3. Note related Change Orders, record Specifications, and record Drawings where applicable.

C. Format: Submit record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.
    1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.6 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01 79 00

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
   1. Instruction in operation and maintenance of systems, subsystems, and equipment.
   2. Demonstration and training video recordings.

1.2 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
   1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

1.3 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit one copy (1) within seven (7) days of end of each training module.
   1. At completion of training, submit complete training manual(s) for Owner's use prepared in same format required for operation and maintenance manuals specified in Section 01 78 23 "Operation and Maintenance Data."

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Preconstruction Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination."

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.6 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
   1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
      a. System, subsystem, and equipment descriptions.
      b. Performance and design criteria if Contractor is delegated design responsibility.
      c. Operating standards.
      d. Regulatory requirements.
      e. Equipment function.
      f. Operating characteristics.
      g. Limiting conditions.
      h. Performance curves.
   2. Documentation: Review the following items in detail:
      a. Emergency manuals.
      b. Systems and equipment operation manuals.
      c. Systems and equipment maintenance manuals.
      d. Product maintenance manuals.
      e. Project Record Documents.
      f. Identification systems.
      g. Warranties and bonds.
      h. Maintenance service agreements and similar continuing commitments.
   3. Emergencies: Include the following, as applicable:
      a. Instructions on meaning of warnings, trouble indications, and error messages.
      b. Instructions on stopping.
      c. Shutdown instructions for each type of emergency.
      d. Operating instructions for conditions outside of normal operating limits.
      e. Sequences for electric or electronic systems.
      f. Special operating instructions and procedures.
   4. Operations: Include the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:
   a. Alignments.
   b. Checking adjustments.
   c. Noise and vibration adjustments.
   d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
   a. Diagnostic instructions.
   b. Test and inspection procedures.
7. Maintenance: Include the following:
   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning.
   e. Procedures for preventive maintenance.
   f. Procedures for routine maintenance.
   g. Instruction on use of special tools.
8. Repairs: Include the following:
   a. Diagnosis instructions.
   b. Repair instructions.
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   d. Instructions for identifying parts and components.
   e. Review of spare parts needed for operation and maintenance.

1.7 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.8 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
   1. Schedule training with Owner with at least ten (10) days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Cleanup: Collect used and leftover educational materials and remove from Project. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.9 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
   1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Digital Video Recordings: Provide high-resolution, digital video.
   1. Submit video recordings on USB thumb drive.

C. Recording: Display continuous running time.

D. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION

STATE OF IDAHO

Idaho Transportation Department

Training Confirmation Sign-In Sheet

Project Name: _____ Project Location: _____

Representative: _____ Date & time:_____

Name	Company	E-mail	Telephone	Signature

PROJECT FINALIZATION AND START-UP

Upon completion of the equipment and systems installation and connections, the contractor shall assemble all equipment factory representative and subcontractors together for system start-up.

These people shall assist in start-up and check out their system(s) and remain at the site until the total system operation is acceptable and understood by the agency's representative(s). The factory representative and system subcontractor shall also give instructions on operation and maintenance of their equipment to the agency's maintenance and/or operation personnel. To prove acceptance of operation and instruction by the agency's representative(s), this written statement of acceptance shall be signed below.

> "I, the Contractor, associated factory representative and subcontractors, have started each system and the total system; and have proven their normal operation to the agency's representative(s) and maintenance/operation personnel and have instructed him/them in the operation and maintenance thereof."

Agency's Representative	Contractor
Signature	Signature
Date	Date

Copyright Release Agreement

Project: ITD D5 Maintenance Building Addition and Renovation and New Brine Facility, Blackfoot, ID

Myers Anderson Architects Project Number: 22569

In response to the Contractor's (Sub-Contractor's) request to obtain electronic copies of portions of the copyrighted documents produced by Myers Anderson Architects, PLLC for the above referenced project, Myers Anderson Architects, PLLC agrees to provide such electronic reproductions with the following conditions:

Contractor (Sub-Contractor) to initial each condition in the space provided.

_____ 1. These electronically reproduced document copies are only for the use of this Contractor (Sub-Contractor); and only as an aid in the production of this Contractor's (Sub-Contractor's) portion of the Work.

_____ 2. All title blocks and other references to Myers Anderson Architects, PLLC, the Architect of Record, the Consultant(s), and the Owner shall be removed.

_____ 3. This Contractor (Sub-Contractor) shall remove all notes, text, and detail cuts from the electronic file prior to use.

_____ 4. This Contractor (Sub-Contractor) agrees to the following indemnity clause:

In consideration of the Contractor's (Sub-Contractor's) use of Architect's copyrighted electronic file documents, the Contractor (Sub-Contractor) agrees that it shall make no claim against Myers Anderson Architects, PLLC and shall further hold harmless, indemnify, and defend Myer Anderson Architects, PLLC from and against any and all claims, costs and expenses resulting from the Contractor's (Sub-Contractor's) use of Architect's copyrighted electronic file documents contained therein.

Contractor (Sub-contractor) Company: _____

Officer & Title (Printed): _____

Officer & Title (Signed): _____

Date: _____

_____
Myers Anderson Architects, PLLC

Representative & Title (Printed): _____

Representative & Title (Signed): _____

Date: _____

122 South Main Street, Suite 1
Pocatello, Idaho 83204
P 208.232.3741
F 208.232.3782
www.myers-anderson.com

REQUEST FOR INTERPRETATION

R.F.I. No: _____ To: _____

Date: _____ Project Name: _____

Regarding: _____ Contract For: _____

From: _____ Project No: _____

Specification Section **Paragraph** **Drawing No** **Detail**

Request:

Signed by: _____ **Date:** _____

Response:

Signed by: _____ **Date:** _____

Date Rec'd: **Date Ret'd:** **Attachments**

Copies: **□Architect** **□Contractor** **□Consultant** **□Owner** **□ Others**

SUBSTITUTION REQUEST

(During the Bidding Phase)

Project: _____

_____

To: _____

_____

Re: _____

_____

Substitution Request Number: _____

From: _____

Date: _____

A/E Project Number: _____

Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 33 00.

☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 33 00.

☐ Substitution rejected - Use specified materials.

☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Supporting Data Attached ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

DIVISION 02 EXISTING CONDITIONS

SECTION 02 41 19

SELECTIVE STRUCTURE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Demolishing designated building equipment and fixtures.
2. Demolishing designated construction.
3. Cutting and alterations for completion of the Work.
4. Removing designated items for reuse and Owner's retention.
5. Protecting items designated to remain.
6. Removing demolished materials.

1.2 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Demolition Schedule: Indicate overall schedule and interruptions required for utility and building services.

C. Shop Drawings:
1. Indicate demolition and removal sequence.
2. Indicate location of items designated for reuse and Owner's retention.
3. Indicate location and construction of temporary work.

1.3 CLOSEOUT SUBMITTALS

A. Section 01 77 00 - Closeout Procedures: Requirements for submittals.

B. Project Record Documents: Accurately record actual locations of capped utilities, concealed utilities discovered during demolition, and subsurface obstructions.

1.4 QUALITY ASSURANCE

A. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.

B. Conform to applicable code for procedures when hazardous or contaminated materials are discovered.

C. Obtain required permits from authorities having jurisdiction.

1.5 PRE-INSTALLATION MEETINGS

A. Section 01 31 00 – Project Management and Coordination: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.6 SEQUENCING

A. Section 01 10 00 - Summary: Requirements for sequencing.

B. Owner will conduct salvage operations before demolition begins to remove materials Owner chooses to retain.

1.7 SCHEDULING

A. Section 01 31 00 – Project Management and Coordination: Requirements for scheduling.

B. Schedule Work to coincide with new construction.

C. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owners operation and in adjoining spaces.

D. Perform noisy work:
   1. Between hours of 8:00 am and 5:00 pm.
   2. On following days: Monday through Saturday.

E. Coordinate utility and building service interruptions with Owner.
   1. Do not disable or disrupt building fire or life safety systems without three days prior written notice to Owner.
   2. Schedule tie-ins to existing systems to minimize disruption.
   3. Coordinate Work to ensure fire sprinklers, fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in occupied areas.

1.8 PROJECT CONDITIONS

A. Conduct demolition to minimize interference with adjacent and occupied building areas.

B. Cease operations immediately if structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.

PART 2 PRODUCTS Not Used.

PART 3 EXECUTION

3.1 PREPARATION

A. Notify affected utility companies before starting work and comply with their requirements.

B. Mark location and termination of utilities.

C. Erect, and maintain temporary barriers and security devices, including warning signs and lights, and similar measures, for protection of the public, Owner, and existing improvements indicated to remain.

D. Erect and maintain weatherproof closures for exterior openings.

E. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy.

F. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.

G. Provide appropriate temporary signage including signage for exit or building egress.

H. Do not close or obstruct building egress path.

I. Do not disable or disrupt building fire or life safety systems without 3 days prior written notice to Owner.

3.2 SALVAGE REQUIREMENTS

A. Coordinate with Owner to identify building components and equipment required to be removed and delivered to Owner.

B. Tag components and equipment Owner designates for salvage.

C. Protect designated salvage items from demolition operations until items can be removed.

D. Carefully remove building components and equipment indicated to be salvaged.

E. Disassemble as required to permit removal from building.

F. Package small and loose parts to avoid loss.

G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.

H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.

I. Deliver salvaged items to Owner. Obtain signed receipt from Owner.

3.3 DEMOLITION

A. Conduct demolition to minimize interference with adjacent and occupied building areas.

B. Maintain protected egress from and access to adjacent existing buildings at all times.

C. Do not close or obstruct roadways and sidewalks without permits.

D. Cease operations immediately when structure appears to be in danger and notify Architect.

E. Disconnect and remove designated utilities within demolition areas.

F. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.

G. Demolish in orderly and careful manner. Protect existing improvements, supporting structural members.

H. Carefully remove building components indicated to be reused.
   1. Disassemble components as required to permit removal.
   2. Package small and loose parts to avoid loss.
   3. Mark components and packaged parts to permit reinstallation.
   4. Store components, protected from construction operations, until reinstalled.

I. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.

J. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.

K. Remove temporary Work.

L. Patch back and repair any existing surfaces called out to remain as if damaged during demolition.

M. Patch back and tie into existing surfaces to match adjacent surfaces.

END OF DIVISION

DIVISION 03 CONCRETE

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Formwork for cast-in place concrete
2. Shoring, bracing, and anchorage
3. Form accessories
4. Form stripping

B. Related Sections:
1. Section 03 20 00 - Concrete Reinforcing
2. Section 03 30 00 - Cast-In-Place Concrete
3. Section 05 50 00 - Metal Fabrications: Product requirements for metal fabrications for placement by this Section

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials
2. ACI 301 - Specifications for Structural Concrete
3. ACI 318 - Building Code Requirements for Structural Concrete
4. ACI 347 - Guide to Formwork for Concrete

1.3 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing in accordance with ACI 318 O2 conform to design and applicable code requirements to achieve concrete shape, line and dimension as indicated on Drawings

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 347, ACI 301, and ACI 318

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Products storage and handling requirements

B. Deliver void forms and installation instructions in manufacturer's packaging

C. Store off ground in ventilated and protected manner to prevent deterioration from moisture

1.6 COORDINATION

A. Section 01 31 00 – Project Management and Coordination.

B. Coordinate this Section with other sections of work, requiring attachment of components to formwork

PART 2 - PRODUCTS

2.1 WOOD FORM MATERIALS

A. Plywood: Douglas Fir species; select sheathing, tight face select sheathing grade; sound undamaged sheets with clean, true edges

B. Lumber Forms:
   1. Application: Use for edge forms and unexposed finish concrete
   2. Boards: 6 inches or 8 inches in width, ship lapped, or tongue and groove, “Standard” Grade Douglas Fir, conforming to WCLIB Standard Grading Rules for West Coast Lumber
   3. Surface boards on four sides

C. Plywood Forms:
   1. Application: Use for exposed finish concrete
   2. Forms: Conform to PS 1; full size 4 x 8 feet panels; each panel labeled with grade trademark of APA/EWA
   3. Plywood for Surfaces to Receive Membrane Waterproofing: Minimum of 5/8 inch thick; APA/EWA “B-B Plyform Structural I Exterior” grade
   4. Plywood where “Smooth Finish” is required, as indicated on Drawings: APA/EWA “HD Overlay Plyform Structural I Exterior” grade, minimum of 3/4 inch thick

2.2 PREFABRICATED FORMS

A. Manufacturers:
   1. EFCO - Economy Forms Corp
   2. Sonoco Products Co
   3. Symons by Dayton Superior
   4. Wall-Ties & Forms, Inc
   5. Western Forms.
   6. Substitutions: Section 01 60 00 - Product Requirements

B. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces

C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces

D. Steel Forms: Sheet steel, suitably reinforced, and designed for particular use indicated on Drawings

E. Form Liners: Smooth, durable, grainless and non-staining hardboard, unless otherwise indicated on Drawings

F. Framing, Studding and Bracing: Stud or No 3 structural light framing grade

2.3 FORMWORK ACCESSORIES

A. Form Ties: Snap-off type, galvanized metal, fixed length, cone type, free of defects capable of leaving holes larger than 1 inch in concrete surface
   1. Manufacturers:
      a. Heckmann Building Products, Inc
      b. Symons by Dayton Superior
      c. Wall-Ties & Forms, Inc
      d. Substitutions: Section 01 60 00 - Product Requirements

B. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face
   1. Wire ties, wood spreaders or through bolts are not permitted

C. Form Anchors and Hangers:
   1. Do not use anchors and hangers exposed concrete leaving exposed metal at concrete surface
   2. Symmetrically arrange hangers supporting forms from structural steel members to minimize twisting or rotation of member
   3. Penetration of structural steel members is not permitted

D. Form Release Agent: Colorless mineral oil that will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete
   1. Manufacturers:
      a. Architectural Concrete Chemicals, LLC
      b. Nox-Crete Products Group
      c. Substitutions: Section 01 60 00 - Product Requirements

E. Vapor Retarder: Where indicated on Drawings, 15-mil thick polyethylene sheet

F. Bituminous Joint Filler: ASTM D1751

G. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 – Project Management and Coordination: Coordination and project conditions

B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings

C. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect

3.2 INSTALLATION

A. Earth Forms:
   1. Earth forms are not permitted

B. Formwork - General:
   1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted
   2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations
   3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings
   4. Carefully verify horizontal and vertical positions of forms
      a. Correct misaligned or misplaced forms before placing concrete
   5. Complete wedging and bracing before placing concrete

C. Forms for Smooth Finish Concrete:
   1. Use steel, plywood or lined board forms
   2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish
   3. Use care in forming and stripping wood forms to protect corners and edges
   4. Level and continue horizontal joints
   5. Keep wood forms wet until stripped

D. Framing, Studding and Bracing:

1. Space studs at 16 inches on center maximum for boards and 12 inches on center maximum for plywood
2. Size framing, bracing, centering, and supporting members with sufficient strength to maintain shape and position under imposed loads from construction operations
3. Construct beam soffits of material minimum of 2 inches thick
4. Distribute bracing loads over base area on which bracing is erected
5. When placed on ground, protect against undermining, settlement or accidental impact

E. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 301 and ACI 318

F. Arrange and assemble formwork to permit dismantling and stripping
1. Do not damage concrete during stripping
2. Permit removal of remaining principal shores

G. Obtain Architect ’s approval before framing openings in structural members not indicated on Drawings

H. Install void forms in accordance with manufacturer's recommendations

I. Do not reuse wood formwork for concrete surfaces to be exposed to view
1. Do not patch formwork

3.3 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items

C. Do not apply form release agent where concrete surfaces are indicated to receive special finishes or applied coverings that are affected by agent
1. Soak inside surfaces of untreated forms with clean water
2. Keep surfaces coated prior to placement of concrete

D. Reuse and Coating of Forms:
1. Thoroughly clean forms and reapply form coating before each reuse
2. For exposed work, do not reuse forms with damaged faces or edges
3. Apply form coating to forms in accordance with manufacturer’s specifications
4. Do not coat forms for concrete indicated to receive “scored finish”
5. Apply form coatings before placing reinforcing steel

3.4 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Install formed openings for items to be embedded in or passing through concrete work

B. Locate and set in place items required to be cast directly into concrete

C. Coordinate with Work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work

D. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain

E. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces

F. Form Ties:
1. Use sufficient strength and sufficient quantity to prevent spreading of forms
2. Place ties at least 1 inch away from finished surface of concrete
3. Leave inner rods in concrete when forms are stripped
4. Space form ties equidistant, symmetrical and aligned vertically and horizontally unless otherwise shown on Drawings

G. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete

H. Construction Joints:
   1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints
   2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage
   3. Show no overlapping of construction joints
   4. Construct joints to present same appearance as butted plywood joints
   5. Arrange joints in continuous line straight, true and sharp

I. Embedded Items:
   1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features
   2. Do not embed wood or uncoated aluminum in concrete
   3. Obtain installation and setting information for embedded items furnished under other Specification sections
   4. Securely anchor embedded items in correct location and alignment prior to placing concrete
   5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations

J. Openings for Items Passing Through Concrete:
   1. Frame openings in concrete where indicated on Drawings
   2. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections
   3. Coordinate work to avoid cutting and patching of concrete after placement
   4. Perform cutting and repairing of concrete required as result of failure to provide required openings

K. Screeds:
   1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs
   2. Slope slabs to drain where required or as shown on Drawings
   3. Before depositing concrete:
      a. Remove debris from space to be occupied by concrete and thoroughly wet forms
      b. Remove freestanding water

L. Screed Supports:
   1. For concrete over waterproof membranes and vapor retarder membranes, use cradle, pad or base type screed supports which will not puncture membrane
   2. Staking through membrane is not be permitted

M. Cleanouts and Access Panels:
   1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material
   2. Clean forms and surfaces against which concrete is to be placed
      a. Remove chips, saw dust and other debris
      b. Thoroughly blow out forms with compressed air just before concrete is placed

3.5 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms

B. Clean formed cavities of debris prior to placing concrete

C. Flush with water or use compressed air to remove remaining foreign matter
   1. Ensure that water and debris drain to exterior through clean-out ports

D. During cold weather:
   1. Remove ice and snow from within forms
   2. Do not use de-icing salts
   3. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure
   4. Use compressed air or other means to remove foreign matter

3.6 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Architect

B. Loosen forms carefully
   1. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged
   1. Discard damaged forms

D. Leave forms in place for minimum number of days as specified in ACI 347

3.7 ERECTION TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301 and ACI 318

3.8 FIELD QUALITY CONTROL

A. Section: Field inspecting, testing, adjusting, and balancing.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure

C. Notify Architect after placement of reinforcing steel in forms, but prior to placing concrete

D. Schedule concrete placement to permit formwork inspection before placing concrete

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Reinforcing bars
   2. Welded wire fabric
   3. Reinforcement accessories

B. Related Sections:
   1. Section 03 10 00 - Concrete Forming and Accessories
   2. Section 03 30 00 - Cast-In-Place Concrete
   3. Section 03 35 00 - Concrete Finishing: Reinforcement for concrete floor toppings

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete
   2. ACI 318 - Building Code Requirements for Structural Concrete
   3. ACI 530.1 - Specifications for Masonry Structures
   4. ACI SP-66 - ACI Detailing Manual

B. ASTM International:
   1. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
   2. ASTM A184/A184M - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement
   3. A185/A185M-07 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
   4. ASTM A496/A496M - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement
   5. ASTM A497/A497M - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement
   6. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

C. American Welding Society:
   1. AWS D1.4 - Structural Welding Code - Reinforcing Steel

D. Concrete Reinforcing Steel Institute:
   1. CRSI - Manual of Standard Practice
   2. CRSI - Placing Reinforcing Bars

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Shop Drawings: Indicate bar sizes, spacing, locations, and quantities of reinforcing steel and welded wire fabric, bending and cutting schedules, and supporting and spacing devices

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements
   1. Submit certified copies of mill test report of reinforcement materials analysis

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with CRSI - Manual of Standard Practice, ACI 301 and ACI 318

B. Prepare shop drawings in accordance with ACI SP-66

1.5 QUALIFICATIONS

A. Welders: AWS qualified within previous 12 months

1.6 COORDINATION

A. Section 01 31 00 – Project Management and Coordination

B. Coordinate with placement of formwork, formed openings and other Work

PART 2 - PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade, deformed billet bars, uncoated finish

B. Plain Wire: ASTM A82/A82M; unfinished

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: type; size and shape to meet Project conditions

2.3 FABRICATION

A. Fabricate concrete reinforcement in accordance with CRSI Manual of Practice, ACI 318 and applicable code

B. Form standard hooks for stirrup and tie hooks, and seismic hooks as indicated on Drawings

C. Form reinforcement bends with minimum diameters in accordance with ACI 318 and applicable code

D. Fabricate column reinforcement with offset bends at reinforcement splices

E. Weld reinforcement in accordance with AWS D1.4

F. Locate reinforcement splices not indicated on Drawings, at point of minimum stress
   1. Review location of splices with Architect

PART 3 - EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement
   1. Do not deviate from required position beyond specified tolerance
      a. Do not weld crossing reinforcement bars for assembly except as permitted by Architect

B. Do not displace or damage vapor retarder

C. Accommodate placement of formed openings

D. Space reinforcement bars with minimum clear spacing in accordance with ACI 318
   1. Where bars are indicated in multiple layers, place upper bars directly above lower bars

E. Maintain concrete cover around reinforcement as follows (verify with structural drawings):

Reinforcement Location		Minimum Concrete Cover
Footings and Concrete Formed Against Earth		3 inches
Concrete exposed to earth or weather	No. 6 bars and larger	2 inches
	No. 5 bars and smaller	1-1/2 inches

F. Splice reinforcing where indicated on Drawings in accordance with splicing device manufacturer's instructions

3.2 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances

3.3 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing

B. Perform field inspection and testing in accordance with ACI 318

C. Provide free access to Work and cooperate with appointed firm

D. Reinforcement Inspection:
   1. Placement Acceptance: Specified and ACI 318 material requirements and specified placement tolerances
   2. Welding: Inspect welds in accordance with AWS D1.1
   3. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing
   4. Weldability Inspection: Inspect for reinforcement weldability when formed from steel other than ASTM A706/A706M
   5. Periodic Weld Inspection: Other welded connections

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete for the following:
   1. Foundation walls
   2. Slabs on grade
   3. Control, expansion and contraction joint devices
   4. Equipment pads
   5. Light pole base
   6. Thrust blocks
   7. Manholes

B. Related Sections:
   1. Section 03 10 00 - Concrete Forming and Accessories: Formwork and accessories Placement of joint device, and joint device anchors in formwork
   2. Section 03 20 00 - Concrete Reinforcing
   3. Section 03 35 00 - Concrete Finishing
   4. Section 03 39 00 - Concrete Curing
   5. Section 07 90 00 - Joint Protection

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete
   2. ACI 305 - Hot Weather Concreting
   3. ACI 306.1 - Standard Specification for Cold Weather Concreting
   4. ACI 308.1 - Standard Specification for Curing Concrete
   5. ACI 318 - Building Code Requirements for Structural Concrete

B. ASTM International:
   1. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field
   2. ASTM C33 - Standard Specification for Concrete Aggregates
   3. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
   4. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete
   5. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete
   6. ASTM C150 - Standard Specification for Portland Cement
   7. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete
   8. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
   9. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
   10. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete
   11. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete
   12. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete
   13. ASTM C595 - Standard Specification for Blended Hydraulic Cements
   14. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
   15. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing

16. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
17. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
18. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
19. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
20. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
21. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials
22. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials
23. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs
24. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

1.3 PERFORMANCE REQUIREMENTS

A. Vapor Retarder Permeance: Maximum 1 perm when tested in accordance with ASTM E96/E96M

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Product Data: Submit data on joint devices, attachment accessories, and admixtures

C. Design Data:
   1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
      a. Hot and cold weather concrete work
      b. Air entrained concrete work
   2. Identify mix ingredients and proportions, including admixtures

1.5 CLOSEOUT SUBMITTALS

A. Section 01 77 00 - Closeout Procedures

B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301

B. Conform to ACI 305 when concreting during hot weather

C. Conform to ACI 306.1 when concreting during cold weather

D. Acquire cement and aggregate from one source for Work

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site

B. Maintain concrete temperature after installation at minimum 50 degrees F for minimum 7 days

1.8 COORDINATION

A. Section 01 31 00 – Project Management and Coordination

B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type II - Moderate Portland type; Normal Weight Aggregates: ASTM C33

B. Aggregate: Maximum size in accordance with ACI 318

C. Water: ACI 318; potable

2.2 ADMIXTURES

A. Manufacturers:
   1. Euclid Chemical Company
   2. Grace Construction Products
   3. Green Umbrella
   4. Sika Corporation
   5. Substitutions: Section 01 60 00 - Product Requirements

B. Air Entrainment: ASTM C260

C. Chemical: Not allowed without prior written approval from the Architect

D. Fly Ash or Calcined Pozzolan: ASTM C618; Not allowed without prior written approval from the Architect

E. Silica Fume: ASTM C1240

F. Plasticizing: ASTM C1017/C1017M; Not allowed without prior written approval from the Architect

2.3 ACCESSORIES

A. Bonding Agent: polysulfide polymer epoxy
   1. Manufacturers:
      a. Euclid Chemical Company
      b. QUIKRETE
      c. Sika Corporation
      d. W.R. Meadows, Inc
      e. Substitutions: Section 01 60 00 - Product Requirements

B. Vapor Retarder: ASTM E1745 Class A; 15 mil thick clear polyethylene film fabric reinforced plastic film; type recommended for below grade application
   1. Furnish joint tape recommended by manufacturer.
   2. Manufacturers:
      a. Carlisle Coatings & Waterproofing Inc
      b. Grace Construction Products
      c. Stego Industries, LLC
      d. W.R. Meadows, Inc
      e. Substitutions: Section 01 60 00 - Product Requirements

C. Concrete Reinforcing Fibers: ASTM C1116, high strength industrial-grade fibers specifically engineered for secondary reinforcement of concrete
   1. Tensile strength: 130 ksi
   2. Toughness 15 ksi

3. Fiber length to be graded: 34 million/lb fiber count
4. Manufacturers:
    a. Euclid Chemical Company
    b. Fibercon International, Inc.
    c. Grace Construction Products
    d. Sika Corporation.
    e. Substitutions: Section 01 60 00 - Product Requirements

2.4 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler: ASTM D1751 or ASTM D994; Asphalt impregnated fiberboard or felt, 1/2 inch thick; tongue and groove profile

B. Construction Joint Devices: Integral galvanized steel or extruded plastic; slab thickness, formed to tongue and groove profile, with removable top strip exposing sealant trough, knockout holes spaced at 6 inches, ribbed steel spikes with tongue to fit top screed edge

C. Expansion and Contraction Joint Devices: ASTM B221 alloy, extruded aluminum; resilient elastomeric vinyl or neoprene filler strip with Shore A hardness of 35 to permit plus or minus 25 percent joint movement with full recovery; extruded aluminum cover plate, of longest manufactured length at each location, flush or recessed mounted; color as selected

D. Sealant and Primer: Type, as specified in Section 07 90 00

2.5 CONCRETE MIX

A. Verify with Structural Drawings.

B. Select proportions for concrete in accordance with ACI 318 field experience

C. Provide concrete to the following criteria:
1. All exposed exterior slab on grade, stem wall, columns, and beams

Material and Property	Measurement
Compressive Strength (28 day)	4000 psi
Cement Type	ASTM C150
Minimum Cement	6.0 sacks per cubic yard
Glass Fiber Reinforcement (slab-on-grade as specified per plan)	1.5 pounds/cu yd
Water-Cement Ratio (maximum)	0.45 by weight (mass)
Air Content (Do not use with towel finish)	5.5 percent plus or minus 1 percent
Slump	3 inches plus or minus 1 inch

2. All footings

Material and Property	Measurement
Compressive Strength (28 day)	3000 psi
Cement Type	ASTM C150
Minimum Cement	5.75 sacks per cubic yard

Water-Cement Ratio (maximum)	0.50 by weight (mass)
Air Content (Do not use with towel finish)	5.5 percent plus or minus 1 percent
Slump	4 inches plus or minus 1 inch

3. All Interior slab-on–grade

Material and Property	Measurement
Compressive Strength (28 day)	4000 psi
Glass Fiber Reinforcement (slab-on-grade as specified per plan)	1.5 pounds/cu yd
Cement Type	ASTM C150
Minimum Cement	5.0 sacks per cubic yard
Water-Cement Ratio (maximum)	0.45 by weight (mass)
Air Content (Do not use with towel finish)	0 percent plus or minus 1.5 percent
Slump	3 inches plus or minus 1 inch

D. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Architect
   1. Use accelerating admixtures in cold weather. Use of admixtures will not relax cold weather placement requirements
   2. Do not use calcium chloride nor admixtures containing calcium chloride
   3. Use set retarding admixtures during hot weather
   4. Add air entrainment admixture to concrete mix for work exposed to freezing and thawing
   5. For concrete exposed to deicing chemicals, limit fly ash, pozzolans, silica fume, and slag content as required by applicable code

E. Average Compressive Strength Reduction: Not permitted

F. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94/C94M

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 – Project Management and Coordination

B. Verify requirements for concrete cover over reinforcement

C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout

C. Remove debris and ice from formwork, reinforcement, and concrete substrates

D. Remove water from areas receiving concrete before concrete is placed

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 301 and ACI 318.

B. Notify testing laboratory and Architect a minimum 24 hours prior to commencement of operations

C. Ensure reinforcement, inserts, embedded parts, formed 11expansion and contraction joints are not disturbed during concrete placement

D. Install vapor retarder under interior slabs on grade in accordance with ASTM E1643
   1. Lap joints minimum 6 inches and seal watertight by adhesive applied between overlapping edges and ends or taping edges and ends

E. Repair vapor retarder damaged during placement of concrete reinforcing
   1. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight

F. Separate exterior slabs on grade from vertical surfaces with 1/2 inch thick joint filler

G. Place joint filler in floor slab pattern placement sequence
   1. Set top to required elevations Secure to resist movement by wet concrete

H. Extend joint filler from bottom of slab to within 1/4 inch of finished slab surface
   1. Conform to Section 07 90 00 for finish joint sealer requirements

I. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

J. Install joint device anchors
   1. Maintain correct position to allow joint cover to be flush with floor and/or wall finish

K. Install joint covers in longest practical length, when adjacent construction activity is complete

L. Apply sealants in joint devices in accordance with Section 07 90 00

M. Deposit concrete at final position
   1. Prevent segregation of mix

N. Place concrete in continuous operation for each panel or section determined by predetermined joints

O. Consolidate concrete

P. Maintain records of concrete placement
   1. Record date, location, quantity, air temperature, and test samples taken

Q. Place concrete continuously between predetermined expansion, control, and construction joints

R. Do not interrupt successive placement; do not permit cold joints to occur

S. Place floor slabs in checkerboard or saw cut pattern indicated

T. Saw cut joints within 12 hours after placing
   1. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness

U. Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/8 inch in 10 ft

3.4 CONCRETE FINISHING

A. Provide formed concrete surfaces to be left exposed concrete walls columns beams joists with sack rubbed finish

B. Finish concrete floor surfaces to requirements of Section 03 35 00

C. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1/8 inch per foot nominal or as indicated on drawings

D. Provide control joint or saw cut at grade break line where floor slopes to floor drain

3.5 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury
   1. Protect concrete footings from freezing for minimum 5 days

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete

C. Cure concrete floor surfaces as specified in Section 03 39 00.

3.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing

B. Perform field inspection and testing in accordance with ACI 318 and applicable code

C. Provide free access to Work and cooperate with appointed firm

D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work

E. Concrete Inspections:
   1. Periodic Curing Inspection: Inspect for proper installation procedures, specified curing temperature and procedures

F. Strength Test Samples:
   1. Sampling Procedures: ASTM C172
   2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, field cured
   3. Sample concrete and make one set of three cylinders for every 25 cu yds or less of each class of concrete placed each day and for every 100 cubic yards thereafter
   4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from randomly selected batches
   5. Make one additional cylinder during cold weather concreting, and field cure

G. Field Testing:
   1. Slump Test Method: ASTM C143/C143M
   2. Air Content Test Method: ASTM C173/C173M and ASTM C231
   3. Temperature Test Method: ASTM C1064/C1064M
   4. Measure slump and temperature for each compressive strength concrete sample
   5. Measure air content in air-entrained concrete for each compressive strength concrete sample

H. Cylinder Compressive Strength Testing:
   1. Test Method: ASTM C39/C39M
   2. Test Acceptance: In accordance with ACI 318
   3. Test one cylinder at 7 days
   4. Test two cylinders at 28 days
   5. Dispose remaining cylinders when testing is not required

I. Maintain records of concrete placement.
   1. Record date, location, quantity, air temperature, and test samples taken

3.7 PATCHING

A. Allow Architect to inspect concrete surfaces immediately upon removal of forms

B. Excessive honeycomb or embedded debris in concrete is not acceptable
   1. Notify Architect upon discovery

C. Patch imperfections as directed by Architect

3.8 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements

B. Repair or replacement of defective concrete will be determined by Architect

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area

3.9 SCHEDULE - CONCRETE TYPES

A. Refer to Structural Drawings

END OF SECTION

SECTION 03 32 00

CONCRETE FOR EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Furnish all labor, materials, and equipment required for concrete work including forming, reinforcing steel, anchor bolts and site concrete.

B. Anchor bolt templates to be supplied by light pole manufacturer.

1.2 JOB CONDITIONS

A. In hot and cold weather, comply with the requirements of ACI 305 and 306.

B. Do not place concrete on frozen ground. Unless adequate protection is provided, do not place concrete during rain, sleet, or snow.

C. Do not allow rain water to increase mixing water or damage surface finish.

D. When temperature of surrounding air is expected to be below 40°F, during placing, or within 24 hours thereafter, do not allow concrete temperature to drop below 55°F, for sections less than twelve inches (12”) in any dimension, or 55°F, for any other sections.
   1. Keep the temperature of concrete, when placed, under 80°F, to preclude loss of slump, flash set, or cold joints.
   2. When temperature of steel is greater than 120°F, spray steel forms and reinforcement with water just prior to placing concrete. Do not allow any water to pond in forms.

1.3 SUBMITTALS

A. Submit mix design to be used for each class of concrete.

B. Submit location of materials source, admixtures to be used, and other related data.

C. Submit test reports showing suitability of aggregates used in concrete mixes.

D. Indicate sizes, spacing, locations of reinforcing steel, wire fabric, bending and cutting schedules, splicing, stirrup spacing, supporting, and spacing devices.

E. The Contractor shall pay any material testing expenses associated with material submittals.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: Use Portland cement conforming to the requirements of ASTM C 150 Type II for low alkali cement.

B. General Admixtures: Admixtures, other than air-entraining agents, may be used when the type and amount to be used are approved. Calcium chloride will not be allowed as an admixture.

C. Air-Entraining Agents: Use air-entraining agents conforming to the requirements of ASTM C 260. Air entraining admixtures shall be added to the mixing water.

D. Water Reducing Agents: Water reducing admixtures may be used to increase workability of the concrete when approved by the Engineer. Use water reducing admixtures conforming to ASTM C 494.

E. Water: Use potable water for mixing concrete.

F. General Aggregate Requirement: The proposed aggregate for the mix shall be tested for expansion and Alkali-Silica Reaction (ASR) in accordance with AASHTO T 303. Where testing indicates aggregates are reactive, the contractor shall use fly ash, lithium compound admixtures, or both to produce a concrete mix that successfully mitigates ASR. Contractor shall provide test results of successful mitigation, using ASTM C 1567, with results showing a linear expansion at 14 days not exceeding 0.10 percent when tested.

G. Coarse Aggregate: Use coarse aggregate that consists of gravel, crushed slag, crushed stone or other approved inert materials, composed of hard, strong and durable particles, free of injurious coatings, and conforming to the requirements of ASTM C 33, except as modified herein.

1. Use only aggregates that include deleterious substances not exceeding the following:

	Percent (by weight)
Soft Fragments	0.20
Coal and Lignite	0.30
Clay Lumps	.30
Other Deleterious Substances	2.0
Minus 200 Material	1.75

2. Use coarse aggregate meeting the following gradations when tested in accordance to the requirements of ASTM C 136.

	Percent Passing (by weight)				
Course Aggregate Size	1"	3/4”	3/8"	No. 4	No. 8
3/4” to No. 4	100	90-100	20-55	1-10	0-5

H. Fine Aggregate: Use aggregate of natural sand or other approved inert materials composed of hard, strong, and durable particles conforming to the requirements of ASTM C 33 except as modified herein.

1. Use only aggregates that include deleterious substances not exceeding the following:

	Percent (by weight)
Clay Lumps	.50
Coal and Lignite	.30
Other Deleterious Substances	2.00

Minus 200 Material	1.75

2. Moisture content of fine aggregate shall not exceed 8 percent.

3. Use fine aggregate that is uniformly graded from coarse to fine within the following gradation, when tested in accordance to the requirements of ASTM C 136.

Sieve Size	Percent Passing (by weight)
3/8"	100
No. 4	95 100
No. 8	80 100
No. 16	50 85
No. 30	25 60
No. 50	10 30
No. 100	2 10

I. Curing Compounds: Use curing compounds that meet the requirements of ASTM C 309.

J. Color Pigment: ASTM C979, synthetic mineral-oxide pigments or colored-water reducing admixtures: color stable, free of carbon black, non-fading, and resistant to lime and other alkalis.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering product that may be incorporated into the Work include, but are not limited to, the following:
   a. Scofield
2. Color: Scofield – as indicated on drawings selected from manufacturer's standard colors.

2.2 FORMING MATERIALS

A. Smooth Forms: Faced with material which will produce smooth, hard, uniform texture on concrete.

B. Form accessories that are to be partially or wholly embedded in concrete are to be a commercially manufactured type:

1. Use form ties constructed so that ends or end fasteners can be removed without causing appreciable spalling of concrete faces.

C. Form Release Agent: Colorless material which will not stain concrete, absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

D. Contraction Joint Material: Wood strips; maximum possible length.

E. Dobie Blocks: Commercial grade blocks to support horizontal reinforcement.

2.3 READY MIX CONCRETE

A. Furnish commercial ready mix shall have the following properties:

Construction Type	Minimum Compressive Strength	Minimum Cement Content	Maximum Water / Cement Ratio	Air Entrainment Percentage	Maximum Slump
Curbs, Gutters	4,000 psi	560 LB/CY	0.44	6.5 ±1.5	2.5 ±1
Concrete Pavement	4,000 psi	560 LB/CY	0.44	6.5 ±1.5	4 ±1
Walking Surfaces – Sidewalks, Patios,	4,500 psi	564 LB/CY	0.44	6.5 ±1.5	4 ±1

B. Fly ash may be used to replace a portion of the Portland cement in the concrete mix. The fly ash used shall not exceed twenty five percent of the total cement material in the mix. The cement material in the mix includes both Portland cement and fly ash. Fly Ash shall be Class F conforming to AASHTO M 295 with the additional requirement that the available alkalies in the fly ash shall not exceed 2 percent.

C. Ready-mixed concrete shall conform to the provisions in ASTM C 94 regarding batching, mixers and agitators, mixing and delivery, inspection, consistency and air content, and certification of batches.

2.4 TRUNCATED DOMES

A. Detectable warning domes shall be pre-manufactured units integrally cast into concrete ramp. The detectable warning surface shall be removable. Use Replaceable Wet-Set, manufactured by ADA Solutions, or approved equal.

B. Color shall be Federal Yellow.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall not incorporate ready mix concrete into the work that does not meet these specifications. The ready mix concrete that is in non-compliance shall be removed from the project.

3.2 FORMING

A. Make forms sufficiently tight to prevent loss of cement paste. Arrange facing material orderly and symmetrical, keeping number of seams to a practical minimum.

B. Securely brace forms against lateral deflection.

C. At construction joints, overlap forms over hardened concrete at least six inches (6"). Hold forms against hardened concrete to prevent offsets or loss of mortar at construction joint and to maintain true surface.

D. Position expansion joint material and other embedded items accurately and support against displacement.

3.3 CONVEYING CONCRETE MIX

A. Unless specifically approved by the Engineer prior to placement of ready mix concrete, all concrete mix shall be placed and discharged completely within 90 minutes of the introduction of water into the mix or before the drum has been revolved 300 revolutions, whichever comes first.

B. Handle concrete from mixer to location of final placing as rapidly as practicable by methods which prevent segregation or loss of ingredients, and assure that quality is maintained.

C. Use only equipment conforming to ASTM C 94.

D. Use only approved pumping equipment that is rated for the lift and the capacity required for placement.
   1. Control pneumatic placement to prevent segregation.
   2. Loss of slump in pumping or pneumatic conveying equipment shall not exceed two inches (2”).
   3. Do not use aluminum or aluminum alloy pipes.

3.4 TRUNCATED DOMES

A. Place truncated domes in fresh concrete in accordance with manufacture’s recommendations.

3.5 CONTROL JOINTS

A. For flatwork, place control (contraction) joints of the type indicated in the plans prior to concrete curing.

B. Install joints spaced no more than 24 times the slab thickness (i.e. a 4-inch thick slab shall have a control joint at least every 96-inches = 8-feet). Contraction joints should be placed to produce panels that are as square as possible and never exceeding a length to width ratio of 1 ½ to 1

C. Joint depth shall be at least 25% of slab depth.

D. Sawcut joints between 6-12 hours after finishing concrete, unless specifically approved otherwise by the engineer. Sawcut as soon as the concrete is hard enough to withstand the energy of sawing without raveling or dislodging aggregate particles, and that the edges abutting the cut do not chip from the saw blade.

3.6 FINISHES

A. Concrete flatwork shall not be trowelled, use screed, float, and broom.

B. Sidewalks to receive a light broom finish perpendicular to the direction of travel.

C. Patios to receive light broom finish.

D. Curbs and Gutter to receive light broom finish parallel to flow line of gutter.

E. Pedestrian ramps to receive a light broom finish perpendicular to the direction of travel.

F. Heavy duty concrete in driveways or pedestrian areas to receive a light broom finish perpendicular to the direction of travel.

3.7 CURING AND PROTECTION

A. To preserve moisture in unformed concrete surfaces, apply one of the following immediately after placement and finishing.
   1. Continuous mist spray.
   2. Waterproof sheet materials, ASTM C 171.
   3. Curing compound, ASTM C 309. Apply in accordance with recommendations of manufacturer immediately after water sheen has disappeared. Do not use on any surface against which additional concrete or other material is to be bonded or adhesively applied, unless it is proven that curing compound will not prevent bond, or unless positive measures are taken to remove it completely from areas to receive bonded applications. Provide curing compound compatible with hardener in areas where hardener is to be used.

B. Cure concrete for seven (7) days.

C. When mean daily outdoor temperature is less than 40°F, maintain temperature of concrete between 50°F and 70°F for required curing period.

3.8 TESTING

A. Perform the following testing:
   1. Entrained Air – Test every 30 yards of concrete delivered to the project.
   2. Slump – Test every 30 yards of concrete delivered to the project.
   3. Strength characteristics – Test every 30 yards of concrete placement with four compressive test cylinders.
   4. Temperature: If air temperature is less than 40°F, test every 30 yards of concrete delivered.
   5. Solar Reflectance (SR)

B. Compressive-strength test results shall be reported in writing to the Engineer within 48 hours of testing. For each set of test cylinders one cylinder shall be tested at 7 days with the remaining three tested at 28 days. Reports of compressive-strength tests shall contain: project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

C. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

3.9 ACCEPTANCE

A. The Engineer will base acceptance of the concrete on parameters specified for the given concrete class. The Engineer will base acceptance of strength from the results of 28-day compression strength test results on cylinders made from concrete being placed. The engineer will consider average strength from three companion cylinders as one test.

B. Replace unacceptable concrete at no additional cost to the Owner.

C. The Engineer will use a price adjustment for concrete that does not meet the intended strength, but is allowed to remain in place by the Engineer, in accordance with the following pay factor (PF) reductions:
   1. If compression strength is ≥ 100% of required, PF = 1.0.

2. If compression strength is ≥ 95% < 100% of required, PF = 0.90.
3. If compression strength is ≥ 90% < 95% of required, PF = 0.80.
4. If compression strength is < 90% of required, subject to rejection, if allowed to remain in place, the PF will be 0.50.

3.10 SPECIAL ONE YEAR WARRANTY

A. Scaled or spalled surfaces exceeding 5% (randomly dispersed or concentrated) per twenty (20) square feet of concrete surfacing area will be considered defective and shall be replaced at the Contractor's expense. The area requiring replacement will be as directed by the Engineer.

END OF SECTION

SECTION 03 35 00

CONCRETE FINISHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Finishing concrete floors
   2. Floor surface treatment

B. Related Sections:
   1. Section 03 30 00 - Cast-In-Place Concrete: Prepared concrete floors ready to receive finish; control and formed expansion and contraction joints and joint devices
   2. Section 03 39 00 - Concrete Curing
   3. Section 07 90 00 - Joint Protection

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete
   2. ACI 302.1 - Guide for Concrete Floor and Slab Construction

B. ASTM International:
   1. ASTM E1155 - Standard Test Method for Determining Floor Flatness and of Levelness Using the F-number System

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Product Data: Submit data on concrete hardener**,** sealer, curing compounds, coatings, and slip resistant treatment, compatibilities, and limitations

1.4 CLOSEOUT SUBMITTALS

A. Section 01 77 00 - Closeout Procedures

B. Operation and Maintenance Data: Submit data on maintenance renewal of applied coatings

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301and ACI 302.1

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience

B. Applicator: Company specializing in performing work of this section with minimum three years documented experience and approved by the manufacturer

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements

B. Deliver materials in manufacturer's packaging including application instructions

1.8 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site

B. Temporary Lighting: Minimum 200 W light source, placed 8 feet above floor surface, for each 425 sq ft of floor being finished

C. Do not finish floors until interior ambient temperature is above of 50 degrees F

D. Ventilation: Sufficient to prevent injurious gases from temporary heat or other sources affecting concrete

1.9 COORDINATION

A. Section 01 31 00 – Project Management and Coordination: Coordination and project conditions

B. Coordinate the Work with concrete floor placement and concrete floor curing

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
1. Dayton Superior Corporation
2. Euclid Chemical Company
3. L&M Construction Chemicals, Inc
4. W.R Meadows, Inc
5. Substitutions: Section 01 60 00 - Product Requirements

2.2 COMPOUNDS - HARDENERS AND SEALERS

A. Curing: Type, as specified in Section 03 39 00

B. Hardener: non-yellowing, liquid type
1. Manufacturers:
   a. Dayton Superior Corporation
   b. Euclid Chemical Company
   c. L&M Construction Chemicals, Inc
   d. W.R Meadows, Inc
   e. Substitutions: Section 01 60 00 - Product Requirements

C. Stain Resistance Concrete Protection: water based, non-yellowing sealer, resistance to chemicals, petroleum product, oils, and greases
1. Manufacturers:
   a. Dayton Superior Corporation L&M Construction Chemicals, IncW.R Meadows, Inc
   b. Substitutions: Section 01 60 00 - Product Requirements

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions

B. Verify floor surfaces are acceptable to receive the Work of this section

3.2 FLOOR FINISHING

A. Cure concrete floor surfaces as specified in Section 03 39 00

B. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1

C. Steel trowel surfaces receiving carpeting, resilient flooring, seamless flooring, and thin set ceramic tile

D. Steel trowel surfaces which are indicated to be exposed

E. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains at 1/8 inch per foot nominal

3.3 FLOOR SURFACE TREATMENT

A. Apply hardener on floor surfaces

B. Apply sealer on floor surfaces

3.4 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances

B. Maximum Variation of Surface Flatness For Exposed Concrete Floors: 1/8 inch in 10 ft

C. Maximum Variation of Surface Flatness Under Seamless Resilient Flooring: 1/8 inch in 10 ft

D. Maximum Variation of Surface Flatness Under Carpeting: 1/8 inch in10 ft

E. Correct defects in defined traffic floor by grinding or removal and replacement of defective Work
   1. Areas requiring corrective Work will be identified
   2. Re-measure corrected areas by same process

3.5 SCHEDULES

A. Refer to Room Finish Schedule for floor finishes

END OF SECTION

SECTION 03 39 00

CONCRETE CURING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes initial and final curing of horizontal and vertical concrete surfaces

B. Related Sections:
   1. Section 03 30 00 - Cast-In-Place Concrete
   2. Section 03 35 00 - Concrete Finishing

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete
   2. ACI 302.1 - Guide for Concrete Floor and Slab Construction
   3. ACI 308.1 - Standard Specification for Curing Concrete
   4. ACI 318 - Building Code Requirements for Structural Concrete

B. ASTM International:
   1. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete
   2. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
   3. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete
   4. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Product Data: Submit data on curing compounds, mats, paper, film, compatibilities, and limitations

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 30, ACI 302.1, and ACI 318

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements

B. Deliver curing materials in manufacturer's packaging including application instructions

PART 2 - PRODUCTS

2.1 MATERIALS

A. Membrane Curing Compound Type B: ASTM C1315 Type I, Class A
   1. Manufacturers:
      a. Dayton Superior Specialty Chemicals
      b. Euclid Chemical Company L&M Construction Chemicals, Inc
      c. W.R. Meadows, Inc
      d. Nox-Crete Products Group
      e. Substitutions: Section 01 60 00 - Product Requirements

B. Non-Membrane Forming Curing Compound Type C: Liquid, penetrating siliconate based type; combination curing, hardening and dust-proofing compound
   1. Manufacturers:

a. L&M Construction Chemicals, Inc
b. Nox-Crete Products Group Vexcon Chemicals Inc
c. Substitutions: Section 01 60 00 - Product Requirements

C. Absorptive Mats: ASTM C171, burlap-polyethylene, minimum 9 oz/sq yd bonded to prevent separation during handling and placing

D. Water: Potable, not detrimental to concrete

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 – Project Management and Coordination: Coordination and project conditions

B. Verify substrate surfaces are ready to be cured

3.2 INSTALLATION - HORIZONTAL SURFACES

A. Cure concrete in accordance with ACI 308.1

B. Membrane Curing Compound: Apply curing compound in two coats with second coat applied at right angles to first

3.3 INSTALLATION - VERTICAL SURFACES

A. Cure concrete in accordance with ACI 308.1

B. Membrane Curing Compound: Apply compound in two coats with second coat applied at right angles to first

3.4 PROTECTION OF FINISHED WORK

A. Section 01 73 00 - Execution: Protecting finished Work

B. Do not permit traffic over unprotected floor surface

END OF SECTION

SECTION 03 60 00

GROUTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Portland cement grout
   2. Non-shrink cementitious grout

B. Related Sections:
   1. Section 03 30 00 - Cast-In-Place Concrete

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 318 - Building Code Requirements for Structural Concrete

B. American Society of Testing and Materials:
   1. ASTM C33 - Standard Specification for Concrete Aggregates
   2. ASTM C40 - Test Method for Organic Impurities in Fine Aggregates for Concrete
   3. ASTM C150 - Standard Specification for Portland cement
   4. ASTM C191 - Test Method for Time of Setting of Hydraulic Cement by Vicat Needle
   5. ASTM C307 - Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings
   6. ASTM C531 - Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes
   7. ASTM C579 - Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts, monolithic Surfacings and Polymer Concretes

C. ASTM C827 - Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures

D. U. S. Army Corps of Engineers Concrete Research Division (CRD):
   1. CRD C621 - Non-Shrink Grout

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals

B. Product Data: Submit product data on grout

1.4 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products

B. Deliver grout in manufacturer's unopened containers with proper labels intact

C. Store grout in a dry shelter, protect from moisture

1.5 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site

B. Maintain minimum temperature of 45 degrees F before, during, and after grouting, until

grout has set

PART 2 - PRODUCTS

2.1 PORTLAND CEMENT GROUT MATERIALS

A. Portland cement: ASTM C150, Type I and II

B. Water:
1. Potable; containing no impurities, suspended particles, algae or dissolved natural salts in quantities capable of causing:
   a. Corrosion of steel
   b. Volume change increasing shrinkage cracking
   c. Efflorescence
   d. Excess air entraining

C. Fine Aggregate:
1. Washed natural sand
2. Gradation in accordance with ASTM C33 and represented by smooth granulometric curve within required limits
3. Free from injurious amounts of organic impurities as determined by ASTM C40

D. Mix:
1. Portland cement, sand and water
2. Do not use ferrous aggregate or staining ingredients in grout mixes

2.2 NON-SHRINK CEMENTITIOUS GROUT

A. Manufacturers:
1. Euclid Chemical Company
2. L&M Construction Chemicals, Inc
3. Quikrete
4. Sika Corporation
5. Substitutions: Section 01 60 00 - Product Requirements

B. Non-shrink Cementitious Grout: Pre-mixed ready for use formulation requiring only addition of water; non-shrink, non-corrosive, non-metallic, non-gas forming, no chlorides

C. Properties: Certified to maintain initial placement volume or expand after set and meet the following minimum properties when tested in accordance with CRD-C621, for Type D non-shrink grout:

D. Properties

	Test	Time	Result
Setting Time	ASTM C191	Initial	2 hours (Approx)
		Final	3 hours (Approx)
Expansion			0.10% - 0.4% Maximum
Compressive Strength	CRD-C621	1 day	4,000 psi
		7 days	7,000 psi
		28 days	10,000 psi to 10,800 psi

2.3 FORMWORK

A. Refer to Section 03 10 00 for formwork requirements

2.4 CURING

A. Prevent rapid loss of water from grout during first 48 hours by use of approved membrane curing compound or with use of wet burlap method

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 – Project Management and Coordination: Verification of existing conditions before starting work

B. Verify areas to receive grout

3.2 PREPARATION

A. Remove defective concrete, laitance, dirt, oil, grease and other foreign material from concrete surfaces by brushing, hammering, chipping or other similar means until sound, clean concrete surface is achieved

B. Rough concrete lightly, but not enough to interfere with placement of grout

C. Remove foreign materials from metal surfaces in contact with grout

D. Align, level and maintain final positioning of components to be grouted

E. Saturate concrete surfaces with clean water; remove excess water, leave none standing

3.3 INSTALLATION - FORMWORK

A. Construct leak proof forms anchored and shored to withstand grout pressures

B. Install formwork with clearances to permit proper placement of grout

3.4 MIXING

A. Portland Cement Grout:
   1. Use proportions of 2 parts sand and 1 part cement, measured by volume
   2. Prepare grout with water to obtain consistency to permit placing and packing
   3. Mix water and grout in two steps; pre-mix using approximately 2/3 of water; after partial mixing, add remaining water to bring mix to desired placement consistency and continue mixing 2 to 3 minutes
   4. Mix only quantities of grout capable of being placed within 30 minutes after mixing
   5. Do not add additional water after grout has been mixed
   6. Capable of developing minimum compressive strength of 2400 psi in 48 hours and 7000 psi in 28 days

B. Mix and prepare non-shrink cementitious grout in accordance with manufacturer's instructions
   1. Capable of developing minimum compressive strength of 2400 psi in 48 hours and 7000 psi in 28 days

C. Mix grout components in proximity to work area and transport mixture quickly and in manner not permitting segregation of materials

3.5 PLACING GROUT

A. Place grout material quickly and continuously

B. Do not use pneumatic-pressure or dry-packing methods

C. Apply grout from one side only to avoid entrapping air

D. Do not vibrate placed grout mixture, or permit placement when area is being vibrated by nearby equipment

E. Thoroughly compact final installation and eliminate air pockets

F. Do not remove leveling shims for at least 48 hours after grout has been placed

3.6 CURING

A. Immediately after placement, protect grout from premature drying, excessively hot or cold temperatures, and mechanical injury

B. After grout has attained its initial set, keep damp for minimum of 3 days

3.7 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing

B. Field inspection and testing will be performed in accordance with ACI 301, ACI 318 and under provisions of Section 01 40 00 - Quality Requirements

C. Submit proposed mix design of each class of grout to testing firm for review prior to commencement of Work

D. Tests of grout components may be performed to ensure conformance with specified requirements

END OF DIVISION

DIVISION 04 MASONRY

SECTION 04 05 03

MASONRY MORTARING AND GROUTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes mortar and grout for masonry

B. Related Sections
   1. Section 04 22 00 - Concrete Masonry Unit
   2. Section 08 12 14 - Standard Steel Frames: Grouting steel door frames

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 530 - Building Code Requirements for Masonry Structures
   2. ACI 530.1 - Specifications for Masonry Structures

B. ASTM International:
   1. ASTM C5 - Standard Specification for Quicklime for Structural Purposes
   2. ASTM C91 - Standard Specification for Masonry Cement
   3. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
   4. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete
   5. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar
   6. ASTM C150 - Standard Specification for Portland Cement
   7. ASTM C206 - Standard Specification for Finishing Hydrated Lime
   8. ASTM C270 - Standard Specification for Mortar for Unit Masonry
   9. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete
   10. ASTM C404 - Standard Specification for Aggregates for Masonry Grout
   11. ASTM C476 - Standard Specification for Grout for Masonry
   12. ASTM C595 - Standard Specification for Blended Hydraulic Cements
   13. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
   14. ASTM C1019 - Standard Test Method for Sampling and Testing Grout
   15. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms
   16. ASTM C1329 - Standard Specification for Mortar Cement
   17. ASTM C1357 - Standard Test Method for Evaluating Masonry Bond Strength

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal requirements

B. Samples: Submit samples of mortar, illustrating mortar color and color range

C. Design Data: Submit design mix when Property specification of ASTM C270 is to be used, required environmental conditions, and admixture limitations

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 and ACI 530.1

1.5 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements

B. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F

C. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Portland Cement: ASTM C150, Type I, gray color

B. Masonry Cement: ASTM C91, Type S, gray color

C. Mortar Cement: ASTM C1329, Types S, gray color

D. Mortar Aggregate: ASTM C144, standard masonry type

E. Hydrated Lime: ASTM C206, Type S

F. Quicklime: ASTM C5, non-hydraulic type

G. Grout Aggregate: ASTM C404, fine and coarse

H. Water: Clean and potable

I. Mortar Color: Mineral oxide pigment; color as selected

J. Admixture: Request approval from Architect

K. Calcium chloride is not permitted

2.2 MIXES

A. Mortar Mixes:
1. Mortar For Structural Masonry: ASTM C270, Type S using Proportion specification
2. Mortar For Non-Structural Masonry: ASTM C270, Type S using Proportion specification

B. Mortar Mixing:
1. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use
2. Achieve uniformly damp sand immediately before mixing process
3. Add mortar color and admixtures to achieve uniformity of mix and coloration
4. Re-temper only within two hours of mixing

C. Grout Mixes:
1. Grout for Non-Structural Masonry: 2,000 psi strength at 28 days; mixed in accordance with ASTM C476 Fine grout
2. Grout for Structural Masonry: 2,000 psi strength at 28 days; mixed in accordance with ASTM C476 Fine grout
3. Application:
   a. Fine Grout: For grouting other spaces

D. Grout Mixing:
1. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476
2. Add admixtures; mix uniformly

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 – Project Management and Coordination: Coordination and project conditions

B. Request inspection of spaces to be grouted

3.2 PREPARATION

A. Apply bonding agent to existing concrete surfaces

3.3 INSTALLATION

A. Install mortar and grout in accordance with ACI 530.1 Specifications for Masonry Structures

B. Solid grout masonry units up first 4’-0” above foundation wall.

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing

B. Establishing Mortar Mix: In accordance with ASTM C270

C. Testing of Mortar Mix: In accordance with ASTM C780 for aggregate ratio and water content, air content, consistency, and compressive strength

D. Testing of Grout Mix: In accordance with ASTM C1019 for compressive strength, and in accordance with ASTM C143/C143M for slump

E. Test flexural bond strength of mortar and masonry units to ASTM C1357; test in conjunction with masonry unit sections specified

F. Test compressive strength of mortar and masonry to ASTM C1314; test in accordance with masonry unit sections specified

END OF SECTION

SECTION 04 22 00

CONCRETE MASONRY UNIT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Concrete masonry units.
   2. Mortar and grout.
   3. Steel reinforcing bars.
   4. Masonry-joint reinforcement.
   5. Embedded flashing.
   6. Miscellaneous masonry accessories.
   7. Masonry-cell fill.

B. Related Requirements:
   1. Section 03 30 00 "Cast-in-Place Concrete" for installing dovetail slots for masonry anchors.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PREINSTALLATION MEETINGS

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:
   1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
   2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Material Certificates: For each type and size of the following:
   1. Masonry units.

a. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
2. Integral water repellant used in CMUs.
3. Cementitious materials. Include name of manufacturer, brand name, and type.
4. Mortar admixtures.
5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
6. Grout mixes. Include description of type and proportions of ingredients.
7. Reinforcing bars.
8. Joint reinforcement.
9. Anchors, ties, and metal accessories.

C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls, and hold cover securely in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

2.3 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet (6 m) vertically and horizontally of a walking surface.

C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
   1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
   1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   2. Provide square-edged units for outside corners unless otherwise indicated.
   3. Provide split face at sills. Refer to elevations for locations.

B. CMUs: ASTM C 90.
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2000 psi (19.3 MPa).
   2. Density Classification: Normal weight.
   3. Size (Actual Dimensions): 7-5/8 inches (92 mm) wide by 7-5/8 inches (92 mm) high by 15-5/8 inches (194 mm) long.

2.5 CONCRETE AND MASONRY LINTELS

A. General: Provide one of the following:

B. Concrete Lintels: ASTM C 1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than that of CMUs.

C. Concrete Lintels: Precast or formed-in-place concrete lintels complying with requirements in Section 03 30 00 "Cast-in-Place Concrete," and with reinforcing bars indicated.

D. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
   1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C 91/C 91M.

E. Mortar Cement: ASTM C 1329/C 1329M.
   1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.

F. Aggregate for Mortar: ASTM C 144.
   1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
   2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
   3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

G. Aggregate for Grout: ASTM C 404.

H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

I. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

J. Water: Potable.

2.7 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

C. Masonry-Joint Reinforcement, General: Ladder type complying with ASTM A 951/A 951M.
   1. Interior Walls: Hot-dip galvanized carbon steel.
   2. Exterior Walls: Hot-dip galvanized carbon.
   3. Wire Size for Side Rods: 0.148-inch (3.77-mm) diameter.
   4. Wire Size for Cross Rods: 0.148-inch (3.77-mm) diameter.
   5. Spacing of Cross Rods: Not more than 16 inches (407 mm) o.c.
   6. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.

2.8 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches (38 mm) into masonry but with at least a 5/8-inch (16-mm) cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
   1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 641/A 641M, Class 1 coating.
   2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.

3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

2.9 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" Section 07 62 00 "Sheet Metal Flashing and Trim" and as follows:
   1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304, 0.016 inch (0.40 mm) thick.
   2. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. (4.9-kg/sq. m) weight or 0.0216 inch (0.55 mm) thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. (3.7-kg/sq. m) weight or 0.0162 inch (0.41 mm) thick.
   3. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
   4. Fabricate through-wall metal flashing embedded in masonry from stainless steel copper, with ribs at 3-inch (76-mm) intervals along length of flashing to provide an integral mortar bond.
   5. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
   6. Fabricate through-wall flashing with drip edge where unless otherwise indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
   7. Fabricate through-wall flashing with sealant stop where unless otherwise indicated. Fabricate by bending metal back on itself 3/4 inch (19 mm) at exterior face of wall and down into joint 1/4 inch (6 mm) to form a stop for retaining sealant backer rod.
   8. Fabricate metal drip edges and sealant stops for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches (76 mm) into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam sheds water.
   9. Fabricate metal drip edges from stainless steel. Extend at least 3 inches (76 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
   10. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches (76 mm) into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 1/4 inch (6 mm) to form a stop for retaining sealant backer rod.
   11. Fabricate metal expansion-joint strips from stainless steel copper to shapes indicated.
   12. Solder metal items at corners.

B. Flexible Flashing: Use one of the following unless otherwise indicated:
   1. Copper-Laminated Flashing: 5-oz./sq. ft. (1.5-kg/sq. m) 7-oz./sq. ft. (2-kg/sq. m) copper sheet bonded between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
   2. Asphalt-Coated Copper Flashing: 5-oz./sq. ft. (1.5-kg/sq. m) 7-oz./sq. ft. (2-kg/sq. m) copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
   3. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.030 inch (0.76 mm) 0.040 inch (1.02 mm).

a. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

4. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.030 inch (0.76 mm) 0.040 inch (1.02 mm).
   a. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
5. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy.
   a. Monolithic Sheet: Elastomeric thermoplastic flashing, 0.040 inch (1.02 mm) thick.
   b. Self-Adhesive Sheet: Elastomeric thermoplastic flashing, 0.025 inch (0.64 mm) thick, with a 0.015-inch- (0.38-mm-) thick coating of adhesive.
   c. Self-Adhesive Sheet with Drip Edge: Elastomeric thermoplastic flashing, 0.025 inch (0.64 mm) thick, with a 0.015-inch- (0.38-mm-) thick coating of rubberized-asphalt adhesive. Where flashing extends to face of masonry, rubberized-asphalt coating is held back approximately 1-1/2 inches (38 mm) from edge.
      1) Color: Gray White Tan/buff Black.
   d. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
6. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D 4637/D 4637M, 0.040 inch (1.02 mm) thick.

C. Application: Unless otherwise indicated, use the following:
   1. Where flashing is indicated to receive counterflashing, use metal flashing.
   2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
   3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge with a sealant stop or flexible flashing with a metal drip edge or elastomeric thermoplastic flashing with a drip edge or flexible flashing with a metal sealant stop.
   4. Where flashing is fully concealed, use metal flashing or flexible flashing.

D. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from UV-resistant, high-density polyethylene. Cell flashing pans have integral weep spouts designed to be built into mortar bed joints and that extend into the cell to prevent clogging with mortar.

E. Solder and Sealants for Sheet Metal Flashings: As specified in Section 07 62 00 "Sheet Metal Flashing and Trim."
   1. Solder for Stainless Steel: ASTM B 32, Grade Sn60 Grade Sn96, with acid flux of type recommended by stainless-steel sheet manufacturer.
   2. Solder for Copper: ASTM B 32, Grade Sn50 with maximum lead content of 0.2 percent.
   3. Elastomeric Sealant: ASTM C 920, chemically curing urethane polysulfide silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.

F. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.10 MASONRY-CELL FILL

A. Loose-Fill Insulation: Perlite complying with ASTM C 549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).

B. Lightweight-Aggregate Fill: ASTM C 331/C 331M.

2.11 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
   1. Do not use calcium chloride in mortar or grout.
   2. Use portland cement-lime masonry cement or mortar cement mortar unless otherwise indicated.
   3. For exterior masonry, use portland cement-lime masonry cement or mortar cement mortar.
   4. For reinforced masonry, use portland cement-lime masonry cement or mortar cement mortar.
   5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
   1. For masonry below grade or in contact with earth, use Type M or Type S.
   2. For reinforced masonry, use Type S.
   3. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
   4. For interior nonload-bearing partitions, Type O may be used instead of Type N.

D. Grout for Unit Masonry: Comply with ASTM C 476.
   1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
   2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2500 psi (14 MPa).
   3. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify that substrates are free of substances that would impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Build chases and recesses to accommodate items specified in this and other Sections.

B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:
1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:
1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm).

C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).

2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches (100 mm). Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
1. Install compressible filler in joint between top of partition and underside of structure above.
2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 90 00 "Joint Protection."

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:
1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
2. Wet joint surfaces thoroughly before applying mortar.
3. Rake out mortar joints for pointing with sealant.

D. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch (6 mm) and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.

E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

F. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

G. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 MASONRY-CELL FILL

A. Pour loose-fill insulation lightweight-aggregate fill into cavities to fill void spaces. Maintain inspection ports to show presence of fill at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of fill to one story high, but not more than 20 feet (6 m).

B. Install molded-polystyrene insulation units into masonry unit cells before laying units.

3.7 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at corners by using prefabricated L-shaped units.

3.8 CONTROL AND EXPANSION JOINTS

A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:
   1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
   2. Install preformed control-joint gaskets designed to fit standard sash block.
   3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
   4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

3.9 LINTELS

A. Provide concrete or masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.

3.10 FLASHING

A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.

B. Install flashing as follows unless otherwise indicated:
   1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
   2. At lintels, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
   3. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 07 90 00 "Joint Protection" for application indicated.
   4. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 07 90 00 "Joint Protection" for application indicated.
   5. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
   6. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
   7. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

3.12 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
   3. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.13 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
   1. Crush masonry waste to less than 4 inches (100 mm) in each dimension.
   2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste.
   3. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.

C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

DIVISON 05 METALS

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Structural shapes.
2. Channels and angles.
3. Hollow structural sections.
4. Structural plates and bars.
5. Fasteners, connectors, and anchors.
6. Grout.

B. Related Sections:
1. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.2 REFERENCES

A. American Institute of Steel Construction:
1. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges.
2. AISC 341 - Seismic Provisions for Structural Steel Buildings.
3. AISC 360 - Specification for Structural Steel Buildings.

B. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
3. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
4. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
5. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

C. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. AWS D1.1 - Structural Welding Code - Steel.

D. Research Council on Structural Connections:
1. RCSC - Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts.

E. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.
2. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
3. SSPC SP 3 - Power Tool Cleaning.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings:
1. Indicate profiles, sizes, spacing, and locations of structural members, openings, attachments, and fasteners.

2. Connections and Connections not detailed.
3. Cambers and loads.
4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

C. Manufacturer's Mill Certificate: Certify products meet or exceed specified requirements.

D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with the following:
1. Structural Steel: Applicable AISC Specifications.
2. High Strength Bolted Connections: RCSC Specification for Structural Joints Using ASTM A 325 or A 490 Bolts.

1.5 QUALIFICATIONS

A. Fabricator: Company specializing in performing Work of this section with minimum ten years documented experience

B. Erector: Company specializing in performing Work of this section with minimum ten years documented experience

C. Shop Painter: Company specializing in performing Work of this section with minimum ten years documented experience

D. Welders and Welding Procedures: AWS D1.1 qualified within previous 12 months.

1.6 COORDINATION

A. Section 01 31 00 – Project management and Coordination: Requirements for coordination.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

A. Structural W-Shapes: ASTM A992

B. Structural M-Shapes: ASTM A36.

C. Structural T-Shapes: Cut from structural W-shapes.

D. Channels and Angles: ASTM A36

E. Square and Rectangular Hollow Structural Sections: ASTM A500/A500M, Grade B.

F. Structural Plates and Bars: ASTM A36/A36M. Floor Plates: ASTM A786/A786M.

2.2 FASTENERS, CONNECTORS, AND ANCHORS

A. Bolts: ASTM A307: Grade A or B.
1. Finish: Unfinished.

B. High Strength Bolts: ASTM A325; Type 1.
1. Finish: Unfinished.

C. Nuts: ASTM A563 heavy hex type.
1. Finish: Unfinished.

D. Washers: ASTM F436; Type 1, circular.
1. Finish: Unfinished.

2.3 WELDING MATERIALS

A. Welding Materials: AWS D1.1; type required for materials being welded.

2.4 ACCESSORIES

A. Grout: Non-shrink type, as specified in Section 03 60 00.

B. Shop Primer: SSPC Paint 15, Type 1, red oxide.

C. Touch-Up Primer: Match shop primer.

2.5 FABRICATION

A. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

B. Fabricate connections for bolt, nut, and washer connectors.

C. Develop required camber for members.

2.6 FINISH

A. Prepare structural component surfaces in accordance with SSPC SP 3.

B. Shop prime structural steel members. Do not prime surfaces that will be field welded or in contact with concrete, Galvanizing for Fasteners, Connectors, and Anchors:
   1. Hot-Dipped Galvanizing: ASTM A153/A153M.
   2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

2.7 SOURCE QUALITY CONTROL AND TESTS

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

B. Shop test bolted and welded connections as specified for field quality control tests.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 – Project Management and Coordination: Verification of existing conditions before starting work.

B. Verify bearing surfaces are at correct elevation.

C. Verify anchors rods are set in correct locations and arrangements with correct exposure for steel attachment.

3.2 PREPARATION

A. Furnish templates for installation of anchor rods and embedments in concrete and masonry work.

3.3 ERECTION

A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.

B. Field weld components and shear connectors indicated on Drawings.

C. Field connect members with threaded fasteners; torque to required resistance.

D. Do not field cut or alter structural members without approval of Architect/Engineer.

E. After erection, touch up welds and abrasions to match shop finishes.

3.4 GROUT INSTALLATION

A. Grout under base plates in accordance with Section 03 60 00.

B. Fill void under bearing surface with grout. Install and pack grout to remove air pockets.

C. Moist cure grout.

D. Remove forms after grout is set. Trim grout edges to from smooth surface, splayed 45 degrees.

E. Tighten anchor bolts after grout has cured for a minimum of 3 days.

3.5 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

C. Maximum Offset From Alignment: 1/4 inch.

3.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Bolted Connections: Inspect in accordance with AISC 303.
   1. Visually inspect all bolted connections.
   2. For Direct Tension Indicators, comply with requirements of ASTM F959. Verify that gaps are less than gaps specified in Table 2.

C. Welding: Inspect welds in accordance with AWS D1.1.
   1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
   2. Visually inspect all welds.
   3. Ultrasonic Inspection: ASTM E164; perform on all full penetration welds.
   4. Liquid Penetrate Inspection: ASTM E165.
   5. Magnetic Particle Inspection: ASTM E709; performed on elements as indicated on structural drawings.
   6. Radiographic Inspection: ASTM E94; performed on as indicated on structural drawings.

D. Correct defective bolted connections and welds.

END OF SECTION

SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Load bearing formed steel stud exterior wall framing
   2. Formed steel framing
   3. Bridging

B. Related Sections:
   1. Section 05 12 00 – Structural Steel Framing: Structural building framing
   2. Section 06 10 53 - Miscellaneous Rough Carpentry: Rough wood blocking
   3. Section 07 21 16 - Blanket Insulation: Insulation within framing members
   4. Section 09 22 16 - Non-Structural Metal Framing

1.2 REFERENCES

A. American Iron and Steel Institute:
   1. AISI General - Standard for Cold-Formed Steel Framing - General Provisions
   2. AISI Header - Standard for Cold-Formed Steel Framing - Header Design
   3. AISI NAS - North American Specification for Design of Cold-Formed Steel Structural Members

B. ASTM International:
   1. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members
   2. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases

C. American Welding Society:
   1. AWS D1.1 - Structural Welding Code - Steel
   2. AWS D1.3 - Structural Welding Code - Sheet Steel
   3. GC-03-2nd Edition, January 7, 1997 - Anti-Corrosive Paints

D. California Department of Health:
   1. GC-03 – 2nd Edition, January 7, 1997 – Anti-Corrosive Paints.

E. National Association of Architectural Metal Manufacturers:
   1. NAAMM ML/SFA 540 - Lightweight Steel Framing Systems Manual

F. SSPC: The Society for Protective Coatings:
   1. SSPC Paint 15 - Steel Joist Shop Paint
   2. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic)

G. Steel Stud Manufacturers Association:
   1. SSMA - Product Technical Information

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal requirements

B. Shop Drawings:
   1. Indicate component details, framed openings, bearing, anchorage, loading, welds, type and location of fasteners, and accessories or items required of related Work
   2. Indicate stud and layout

3. Describe method for securing studs to tracks and for bolted and welded framing connections
4. Submit calculations for loadings and stresses of specially fabricated framing under Professional engineer's seal

C. Submit product data:
1. Standard framing members
a. Materials and finish
b. Product criteria
c. Limitations

1.4 QUALITY ASSURANCE

A. Calculate structural properties of framing members in accordance with AISI NAS

B. Furnish framing materials in accordance with SSMA - Product Technical Information

C. Perform Work in accordance with the following:
1. Framing: AISI General and AISI NAS
2. Headers: AISI Header
3. Wall Studs: AISI WSD
4. Lateral Design: AISI Lateral

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience
1. Current member of Steel Stud Manufacturers Association

B. Installer: Company specializing in performing Work of this section with minimum five years documented experience

C. Design structural elements under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location

D. Form, fabricate, provide, and connect components in accordance with NAAMM ML/SFA 540 - Lightweight Steel Framing Systems Manual

1.6 COORDINATION

A. Section 01 31 00 – Project Management and Coordination

B. Coordinate placement of components within stud framing system specified in other sections

PART 2 - PRODUCTS

2.1 COLD-FORMED METAL FRAMING

A. Manufacturers
1. California Expanded Metal Products Company
2. ClarkDietrich Building Systems
3. Consolidated Fabricators Corp
4. Nuconsteel, A Nucor Company
5. SCAFCO Corporation
6. Steeler, Inc
7. Substitutions: Section 01 60 00 - Product Requirements

2.2 FRAMING COMPONENTS

A. Manufactured from prime mill certified steel; re-rolled steel without mil certificate not acceptable
1. Steel Sheet: ASTM A1003/A1003M; Structural Grade, Type H, metallic coated:

a. Coating: G60

B. Cold-Formed Structural Studs: Galvanized steel C-studs complying with ASTM C955
1. Flange length: 1-5/8 inches. As indicated on Drawings
2. Web depth: 3-1/2, 3-5/8, 6, and 8 inches as indicated on Drawings
3. Minimum material thickness: 16 and 14 gage as indicated on drawings
4. Minimum yield strength: 33 KSI as required by design
5. Stud Punch-outs: Minimum 10 inches between end of member and near edge of web punch-out and 24 inches on center thereafter, per ASTM C955

C. Structural Track: Cold-formed galvanized steel runner tracks complying with ASTM C955.
1. Flange length: 1-1/2 inches as indicated on Drawings
2. Web: Track web size to match stud web size
3. Minimum material thickness: To match wall stud thickness
4. Minimum yield strength: 33 KSI as required by design

D. Standard Clip Angles:
1. Minimum thickness: 16 and 14 gage as indicated on drawings
2. Minimum yield strength: 50 KSI

E. U-Channel (CRC Cold Rolled Channel):
1. Thickness: as indicated on drawings
2. Size: As required by design

F. Girts: Steel sheet formed to channel cee and zee shape, solid web
1. Thickness: as indicated on drawings
2. Size: As shown on drawings

G. Sound Walls:
1. Safco 6” Sound Guard wall system or similar

2.3 ACCESSORIES

A. Framing Accessories: As required for project, complying with ASTM C955
1. Flat strapping for X-bracing
2. Flat strapping and bridging for lateral bracing
3. Gusset plates
4. Flat steel sheets

B. Shop Primer: SSPC Paint 15, Type 1, red oxide

C. Touch-Up Primer: Match shop primer

D. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20, Type I Inorganic or Type II Organic

2.4 FASTENERS

A. Fasteners: Self-drilling, self-tapping screws complying with ASTM C1513, hot dip galvanized

B. Anchorage Devices: as detail on the drawings

C. Welding: In conformance with AWS D1.1 and AWS D1.3

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 – Project Management and Coordination

B. Verify substrate surfaces and building framing components are ready to receive Work

C. Verify rough-in utilities are in proper location

3.2 ERECTION OF STUDS

A. Align floor and ceiling tracks; locate to wall and partition layout
   1. Secure in place with fasteners at maximum 24 inches oc

B. Place studs at 16 inches oc; not more than 2 inches from abutting walls and at each side of openings
   1. Connect studs to tracks using fastener method

C. Construct corners using minimum three studs
   1. Double stud wall openings, door jambs, and window jambs

D. Erect load bearing studs one piece full length
   1. Splicing of studs is not permitted

E. Erect load bearing studs, brace, and reinforce to develop full strength, to achieve design requirements

F. Fully seat axial loaded studs in receiving tracks (maximum 1/16 inch gap between stud and track web)

G. Coordinate placement of insulation in multiple stud spaces after erection

H. Install intermediate studs above and below openings to align with wall stud spacing

I. Install studs with deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing

J. Attach cross studs to studs for attachment of fixtures anchored to walls

K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation

L. Touch-up field welds and damaged metallic coatings and primed surfaces with primer to match shop coating

M. Complete framing ready to receive finishes

3.3 ERECTION OF GIRTS

A. Install framing components.

B. Make provisions for erection stresses
   1. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed

C. Place grits as indicated on Drawings; not more than 2 inches from abutting walls
   1. Connect joists to supports using fastener method

D. Locate joist end bearing directly over load bearing studs or install load distributing member to top of stud track

E. Install web stiffeners as required by design

F. Touch-up field welds and damaged metallic coatings and primed surfaces with primer to match shop coating

G. Complete framing ready to receive finishes

3.4 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances

B. Maximum Variation from Indicated Position: 1/4 inch

C. Maximum Variation of Members from Plane: 1/4 inch

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes shop fabricated metal items.

B. Related Sections:
1. Section 05 12 00 - Structural Steel Framing: Structural steel anchor bolts.

1.2 REFERENCES

A. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.
4. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
5. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
6. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
7. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
8. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
9. ASTM F436 - Standard Specification for Hardened Steel Washers.
10. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

B. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. AWS D1.1 - Structural Welding Code - Steel.

C. National Ornamental & Miscellaneous Metals Association:
1. NOMMA Guideline 1 - Joint Finishes.

D. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal requirements.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.4 QUALITY ASSURANCE

A. Finish joints in accordance with NOMMA Guideline 1.

1.5 QUALIFICATIONS

A. Design under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Accept metal fabrications on site in labeled shipments. Inspect for damage.

C. Protect metal fabrications from damage by exposure to weather.

1.7 FIELD MEASUREMENTS

A. Verify field measurements are as indicated drawings.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

A. Structural Shapes: STM A36/A36M.

B. Steel Plate: ASTM A36/A36M.

C. Hollow Structural Sections: ASTM A500/A500M, Grade B.

D. Sheet Steel: ASTM A653/A653M, Grade 33 Structural Quality.

E. Bolts: ASTM A325; Type 1.
1. Finish: Mechanically galvanized.

F. Nuts: ASTM A563 heavy hex type.
1. Finish: Mechanically galvanized.

G. Washers: ASTM F436; Type 1.
1. Finish: Mechanically galvanized.

H. Welding Materials: AWS D1.1; type required for materials being welded.

I. Shop Primer: SSPC Paint 15, Type 1, red oxide.

J. Touch-Up Primer: Match shop primer.

2.2 STRUCTURAL SUPPORTS

A. Other Structural Supports: Steel sections, shape and size as indicated on Drawings ; prime paint, one coat .

2.3 DOOR FRAMES

A. Door Frames: Steel channel sections, size indicated on Drawings, with jamb anchors suitable for building into masonry, attachment to concrete, and, minimum 4 anchors per jamb; prime paint, one coat

2.4 BOLLARDS

A. Bollards: Steel pipe, concrete filled, crowned cap, 6 in diameter, length as indicated on Drawings; prime paint, one coat

B. Concrete Fill: 3,000 psi as specified in Section 03 30 00 - Cast-in-Place Concrete

C. Anchors: Concealed type as indicated on Drawings

2.5 FABRICATED ARCHITECTURAL TRIM

A. Steel sections, size and configuration as indicated on Drawings

B. Exterior Locations: Prime paint, one coat

2.6 ANCHORS

A. Anchor Rods: ASTM A307; Grade A
   1. Shape: Hooked and Straight
   2. Furnish with nut and washer; unfinished

B. Epoxy Adhesive Anchors:
   1. Manufacturer List:
      a. Cobra Anchors
      b. Hilti, Inc
      c. Simpson Strong-Tie Co., Inc
      d. Substitutions: Section 01 60 00 - Product Requirements

C. Grout: According to Section 03 60 00 - Grouting

D. Threaded Rod: As shown on the drawings or as approved by Architect

2.7 ANCHOR BOLTS

A. Anchor Rods: ASTM F1554; Grade 55, wieldable.
   1. Shape: Hooked.
   2. Furnish with nut and washer; unfinished.

2.8 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.9 FACTORY APPLIED FINISHES - STEEL

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Prime paint items with two coats except where galvanizing is specified.

D. Galvanizing: ASTM A123/A123M; hot dip galvanize after fabrication.

E. Chrome Plating: ASTM B177, weight, nickel-chromium alloy, polished finish.

2.10 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 – Project Management and Coordination

B. Verify field conditions are acceptable and are ready to receive Work.

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal and aluminum where site welding is required.

B. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Make provisions for erection stresses. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed.

C. Field weld components indicated on Drawings.

D. Perform field welding in accordance with AWS D1.1.

E. Obtain approval of Architect/Engineer prior to site cutting or making adjustments not scheduled.

F. After erection, touch up welds, abrasions, and damaged finishes with prime paint or galvanizing repair paint to match shop finishes.

3.4 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation From Plumb: 1/4 inch per story or for every 12 ft in height whichever is greater, non-cumulative.

C. Maximum Offset From Alignment: 1/4 inch.

D. Maximum Out-of-Position: 1/4 inch.

3.5 FIELD QUALITY CONTROL

A. Welding: Inspect welds in accordance with AWS D1.1.

END OF DIVISION

DIVISION 06 WOOD, PLASTICS, AND COMPOSITES

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Section includes structural wall and roof framing; built-up structural beams and columns; wall, and roof sheathing; sill gaskets; and miscellaneous framing and sheathing.

B. Related Sections:
   1. Section 06 10 53: Miscellaneous Rough Carpentry.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI A135.4 - Basic Hardboard.
   2. ANSI A208.1 - Mat-Formed Wood Particleboard.

B. American Wood-Preservers' Association:
   1. AWPA M4 - Standard for the Care of Preservative-Treated Wood Products.

C. AWPA ASTM International:
   1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   2. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

D. The Redwood Inspection Service:
   1. RIS - Standard Specifications for Grades of California Redwood Lumber.

E. Southern Pine Inspection Bureau:
   1. SPIB - Standard Grading Rules for Southern Pine Lumber.

F. U.S. Department of Commerce National Institute of Standards and Technology:
   1. DOC PS 1 - Construction and Industrial Plywood.
   2. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
   3. DOC PS 20 - American Softwood Lumber Standard.

G. West Coast Lumber Inspection Bureau:
   1. WCLIB - Standard Grading Rules for West Coast Lumber.

H. Western Wood Products Association:
   1. WWPA G-5 - Western Lumber Grading Rules.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with the following:
   1. Lumber Grading Agency: Certified by DOC PS 20.
   2. Lumber: DOC PS 2 Apply label from agency approved by authority having jurisdiction to identify each preservative treated material.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Protect trusses from warping or other distortion by stacking in vertical position, braced to resist movement.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

A. Lumber Grading Rules: NLGA RIS SPIB WCLIB WWPA or NELMA.

B. Beam Framing: Douglas Fir - Larch grade, No 2 or better, 19 percent maximum moisture content.

C. Parallel Strand Lumber (PSL) – Weyerhaeuser 2.0E Parallam.

D. Joist Framing: Douglas Fir - Larch grade, No 2 or better, 19 percent maximum moisture content.

E. Non-structural Light Framing: Douglas Fir - Larch grade, No 2 or better, 19 percent maximum moisture content.

F. Studding: Douglas Fir - Larch grade, No 2 or better, 19 percent maximum moisture content.

G. Miscellaneous Framing: Douglas Fir - Larch grade, No 2 or better, 19 percent maximum moisture content, pressure preservative treat where required by code.

2.2 SHEATHING MATERIALS

A. Wood Structural Panel Roof Sheathing: EWA Rated Sheathing; Plywood Oriented Strand Board Span Rating as noted on structural drawings; Exposure Durability 1 exterior; unsanded.

B. Particleboard Roof Sheathing: ANSI A208.1 Waferboard Structural Particleboard; wood chips shavings flakes set with waterproof resin binder; grade as noted on structural drawings; unsanded faces.

C. Wood Structural Panel Wall Sheathing: EWA Rated Sheathing, Plywood Oriented Strand Board; Span Rating as noted on structural drawings; Exposure Durability 1 Exterior; unsanded.

D. Particleboard Wall Sheathing: ANSI A208.1 EWA Waferboard Structural Particleboard; wood chips, shavings, and flakes set with waterproof resin binder; grade as noted on structural drawings; unsanded faces.

2.3 SHEATHING AND UNDERLAYMENT LOCATIONS

A. Sloped Roof Sheathing: 19/32 inches thick; Span Rating: 40/20; 48 x 96 inch sized sheets, square edges.

B. Wall Sheathing: 7/16 inch thick, Span Rating 32/16, 48 x 96 inch sized sheets, square edges.

C. Floor Sheathing: 3/4 inch thick, Span Rating 40/20, 48 x 96 inch sized sheets, square edges.

D. Underlayment: 3/8 inch thick, type recommended by flooring manufacturer

2.4 FIREBLOCKING AND DRAFTSTOPPING

A. Fireblocking: Solid lumber, structural wood panel, or particleboard.
   1. Solid lumber nominal 2 inches thick.
   2. Two layers of solid lumber nominal 1 inch thick with broken lapped joints.
   3. Structural wood panel 23/32 inch thick with joints backed by structural wood panel.
   4. Particleboard 3/4 inch thick with joints backed by particleboard.

2.5 ACCESSORIES

A. Fasteners and Anchors:
   1. Fasteners: ASTM A153/A153M, hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
   2. Nails and Staples: ASTM F1667.
   3. Drywall Screws: Bugle head, hardened steel, power driven type, length to achieve full penetration of sheathing substrate.
   4. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

B. Die Stamped Connectors: inch thick, hot dipped galvanized steel.

C. Structural Framing Connectors: Hot dipped galvanized steel, sized to suit framing conditions.

D. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, glass fiber strip.

E. Subfloor Glue: EWA AFG-01, waterproof of water base, air cure type, and cartridge dispensed.

F. Building Paper: ASTM D226; Type I, No. 15 unperforated asphalt felt.

PART 3 EXECUTION

3.1 FRAMING

A. Set structural members level and plumb, in correct position.

B. Make provisions for erection loads, for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.

C. Place horizontal members, crown side up.

D. Construct load bearing framing and curb members full length without splices.

E. Double members at openings over inches wide. Space short studs over and under opening to stud spacing.

F. Construct double joist headers at floor and ceiling openings and under wall stud partitions parallel to floor joists. Frame rigidly into joists.

G. Bridge joists at mid-span. Fit solid blocking at ends of members.

H. Place sill gasket directly on cementitious foundation. Puncture gasket clean and fit tight to protruding foundation anchor bolts.

I. Coordinate installation of glue laminated structural units, prefabricated wood trusses, and wood “I” joists.

J. Coordinate curb installation with installation of roof sheathing roofing and vapor retardant.

3.2 SHEATHING

A. Secure roof sheathing with longer edge (strength axis) perpendicular to framing members and with ends staggered and sheet ends over bearing.

B. Use sheathing clips between sheets between roof framing members. Install solid edge blocking between sheets.

C. Secure wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered. Place building air barrier over wall sheathing; weather lap edges and ends.

D. Install plywood to simple span.

3.3 FIREBLOCKING AND DRAFTSTOPPING

A. Install fireblocking to cut off concealed draft openings.
   1. Concealed Framed Wall and Furred Spaces: Install fireblocking vertically at floor and ceiling levels and horizontally at maximum 10 feet on center.
   2. Connections Between Horizontal and Vertical Spaces: Install fireblocking between vertical walls and partitions and the following:
      a. Horizontal roof framing.
      b. Soffits, dropped ceilings, cove ceilings and other horizontal concealed spaces.
   3. Exterior Combustible Architectural Trim: Install fireblocking at maximum 20 feet on center

3.4 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances

B. Framing Members: 1/4 inch from indicated position, maximum.

C. Surface Flatness of Floor: 1/4 inch in 10 feet maximum, and 1/2 inch in 30 feet maximum.

END OF SECTION

SECTION 06 10 53

MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Section includes roof curbs, and perimeter nailers; blocking in wall and roof openings; wood furring and grounds; wall cabinets, wood trim; telephone and electrical panel back boards; and concealed wood blocking for support.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI A208.1 - Mat-Formed Wood Particleboard.

B. American Wood-Preservers' Association:
   1. AWPA M4 - Standard for the Care of Preservative-Treated Wood Products.

C. ASTM International:
   1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   2. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

D. The Redwood Inspection Service:
   1. RIS - Standard Specifications for Grades of California Redwood Lumber.

E. Southern Pine Inspection Bureau:
   1. SPIB - Standard Grading Rules for Southern Pine Lumber.

F. U.S. Department of Commerce National Institute of Standards and Technology:
   1. DOC PS 1 - Construction and Industrial Plywood.
   2. DOC PS 20 - American Softwood Lumber Standard.

G. West Coast Lumber Inspection Bureau:
   1. WCLIB - Standard Grading Rules for West Coast Lumber.

H. Western Wood Products Association:
   1. WWPA G-5 - Western Lumber Grading Rules.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with the following:
   1. Lumber Grading Agency: Certified by DOC PS 20.
   2. Lumber: DOC PS 20.

PART 2 PRODUCTS

2.1 MATERIALS

A. Lumber Grading Rules: NLGA RIS SPIB WCLIB WWPA or NELMA.

B. Miscellaneous Framing: Douglas Fir - Larch grade, No 2 or better, 19 percent maximum moisture content.

C. Plywood: EWA Rated Sheathing; Plywood Oriented Strand Board Span Rating as noted on structural drawings; Exposure Durability 1 exterior; unsanded.

D. Particleboard: ANSI A208.1 Waferboard Structural Particleboard; wood chips shavings flakes set with waterproof resin binder; grade as noted on structural drawings; unsanded

faces.

2.2 ACCESSORIES

A. Fasteners and Anchors:
1. Fasteners: ASTM A153/A153M, hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
2. Nails and Staples: ASTM F1667.
3. Drywall Screws: Bugle head, hardened steel, power driven type, length to achieve full penetration of sheathing substrate.
4. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

2.3 FACTORY WOOD TREATMENT

A. Wood Preservative (Pressure Treatment): AWPA U1, Commodity Specification A-Sawn Products or F-Wood Composites using water-borne preservative.

B. Wood Preservative (Surface Application): Clear, Fire Retardant Treatment: Chemically treated and pressure impregnated, having flame spread of 25 or less when tested in accordance with ASTM E 84 and showing no evidence of significant progressive combustion when test is continued for an additional 20 minute period, Interior Type.

C. Moisture Content after Treatment: Kiln dried (KDAT).
1. Lumber: Maximum 19 percent.
2. Structural Panels: Maximum 15 percent.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 – Project Management and Coordination: Verification of existing conditions before starting work.

B. Verify substrate conditions are ready to receive blocking, curbing and framing.

3.2 PREPARATION

A. Coordinate placement of blocking, curbing and framing items.

3.3 INSTALLATION

A. Set members level and plumb, in correct position.

B. Place horizontal members, crown side up.

C. Construct curb members of solid wood sections.

D. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

E. Coordinate curb installation with installation of decking and support of deck openings, and roofing vapor retardant.

F. Space framing and furring 16 inches oc.

G. Secure sheathing to framing members with ends over firm bearing and staggered.

H. Install telephone and electrical panel back boards with plywood sheathing material where required. Size back boards 12 inches beyond size of electrical and telephone panel.

END OF DIVISION

DIVISION 07 THERMAL AND MOISTURE PROTECTION

SECTION 07 21 13

BOARD INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes rigid board insulation at perimeter foundation wall, exterior wall behind gypsum board wall finish, and horizontally under slab at foundation perimeter.

B. Related Sections:
   1. Section 03 30 00 - Cast-In-Place Concrete: Board insulation at perimeter foundation wall
   2. Section 07 21 16 - Blanket Insulation
   3. Section 09 21 16 - Gypsum Board Assemblies: Board insulation behind gypsum board wall finish

1.2 REFERENCES

A. ASTM International:
   1. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
   2. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics
   3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

B. Scientific Certification Systems (SCS):
   1. SCS Recycled Content Certification.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Product Data: Submit data on product characteristics, performance criteria, limitations and, adhesives

1.4 QUALITY ASSURANCE

A. Insulation Installed in Concealed Locations Surface Burning Characteristics:

B. Foam Plastic Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84

C. Insulation Installed in Exposed Locations Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84

1.5 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements

B. Do not install adhesives when temperature or weather conditions are detrimental to successful installation

1.6 SEQUENCING

A. Section 01 10 00 - Summary: Work sequence

B. Sequence Work to ensure firestopping materials are in place before beginning Work of this section

1.7 COORDINATION

A. Section 01 31 00 – Project Management and Coordination

B. Coordinate Work with Section 07 26 00 for installation of vapor retarder

PART 2 - PRODUCTS

2.1 BOARD INSULATION

A. Manufacturers:
   1. ACH Foam Technologies, LLC
   2. DiversiFoam Products
   3. Dow Chemical Company
   4. Johns Manville
   5. Owens Corning
   6. Substitutions: Section 01 60 00 - Product Requirements

2.2 COMPONENTS

A. Expanded Polystyrene Insulation (EPS): ASTM C578 Type, polystyrene board with the following characteristics:
   1. Board Density: 1.30lb/cu ft
   2. Board Size: 48 x 96 or 24 x 96 inch
   3. Board Thickness: 2 inches
   4. Thermal Resistance: R of 3.7 per inch
   5. Water Absorption: In accordance with ASTM D2842; 4 percent by volume maximum
   6. Compressive Strength: Minimum 40 psi
   7. Board Edges: Square edges

B. Extruded Polystyrene Insulation (XPS): ASTM C578 Type VI; cellular type, conforming to the following:
   1. Board Size: 48 x 96 or 24 x 96 inch
   2. Board Thickness: 2 inches
   3. Thermal Resistance: R of 5.0 per inch
   4. Water Absorption: In accordance with ASTM D2842; 0.3 percent by volume maximum
   5. Compressive Strength: Minimum 25 psi
   6. Board Edges: Square edges

2.3 ACCESSORIES

A. Adhesive: Type recommended by insulation manufacturer for application

B. Tape: Type recommended by insulation manufacturer for application

C. Insulation Fasteners: Impaling clip of galvanized steel with washer retainer and clips, to be mechanically fastened to surface to receive board insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 – Project Management and Coordination

B. Verify substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive

C. Verify substrate surface is flat, free of honeycomb, fins, irregularities, materials or substances affecting adhesive bond

3.2 INSTALLATION - FOUNDATION PERIMETER

A. Apply adhesive in three continuous beads per board length to full bed 1/8 inch thick

B. Install boards on foundation wall perimeter, vertically or horizontally

C. Place boards in method to maximize contact bedding

D. Stagger side and end joints

E. Butt edges and ends tight to adjacent board and to protrusions

F. Extend boards over control or expansion joints, unbonded to foundation 6 inches on one side of joint

G. Cut and fit insulation tight to protrusions or interruptions to insulation plane

H. Immediately following application of board insulation, place protective boards over exposed insulation surfaces, apply adhesive in five continuous beads per board length

I. Install boards horizontally or vertically from base of foundation to top of insulation

J. Butt board joints tight; stagger from insulation joints

3.3 INSTALLATION - EXTERIOR WALLS

A. Secure boards to substrate by mechanical attachment to achieve continuous flush insulation surface

B. Fastener: 6 per insulation board

C. Apply adhesive in three continuous beads per board length to full bed 1/8 inch thick
   1. Daub adhesive tight to protrusions

D. Install boards on wall surface, vertically or horizontally

E. Place boards in method to maximize contact bedding
   1. Stagger end joints. Butt edges and ends tight to adjacent board and to protrusions

F. Cut and fit insulation tight to protrusions or interruptions to insulation plane

G. Tape insulation board joints

3.4 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 77 00 - Closeout Procedures: Protecting installed construction

B. Do not permit damage to insulation prior to covering

3.5 SCHEDULE

A. Foundation and Under Slab: 2 inch; Extruded Polystyrene Insulation (XPS)

B. Exterior Furred Walls Interior Face:
   1. Expanded Polystyrene Insulation (EPS) with metal furring
   2. Integrated Furring and Insulation System

C. Exterior Walls, Interior Face:
   1. EPS with furring system.

END OF SECTION

SECTION 07 21 16

BLANKET INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes batt insulation in exterior wall and roof construction and for filling perimeter window and door shim spaces, and crevices in exterior wall.

B. Related Sections:
1. Section 06 10 00 – Rough Carpentry; Wood stud framing
2. Section 07 21 13 - Board Insulation.
3. Section 07 25 00 - Weather Barriers: Air barrier materials adjacent to insulation.
4. Section 09 21 16 - Gypsum Board Assemblies: Acoustic batt insulation within metal stud wall.

1.2 REFERENCES

A. ASTM International:
1. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
3. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.

1.3 SYSTEM DESCRIPTION

A. Materials of This Section: Provide continuity of thermal barrier at building enclosure elements.

1.4 PERFORMANCE REQUIREMENTS

A. Vapor Retarder Permeance: Maximum 1 perm when tested in accordance with ASTM E96/E96M.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data on product characteristics, performance criteria, limitations.

1.6 QUALITY ASSURANCE

A. Insulation Installed in Concealed Locations Surface Burning Characteristics:
1. Batt Insulation: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.7 COORDINATION

A. Section 01 31 00 – Project Management and Coordination.

PART 2 PRODUCTS

2.1 BATT INSULATION

A. Manufacturers:
1. CertainTeed Insulation

2. Johns Manville.
3. Knauf Fiber Glass.
4. Owens Corning Fiberglas.
5. U.S. Gypsum Co. Thermafiber LLC.
6. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

A. Wall Insulation: Batt Insulation: ASTM C665; preformed glass mineral fiber batt, roll, or blanket; conforming to the following:
   1. Interior Walls 2 x 6:
      a. Minimum Thermal Resistance: R of 19.
      b. Roll Size: 16 inch.
      c. Thickness: Full depth of the girts and studs
      b. Facing: friction fit, unfaced
   2. Interior Walls 2 x 4:
      a. Minimum Thermal Resistance: R of 13.
      b. Roll Size: 16 inch.
      c. Thickness: Full depth of studs
      d. Facing: Friction fit, unfaced.

B. Staples: Steel wire; type and size to suit application.

C. Tape: Polyethylene self-adhering type, mesh reinforced, 2 inch wide.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 – Project Management and Coordination.

B. Verify substrate, adjacent materials, and insulation are dry and ready to receive insulation.

3.2 INSTALLATION

A. Install in interior and exterior walls and roof spaces without gaps or voids. Do not compress insulation.

B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

C. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of insulation.

D. Staple or nail facing flanges in place at maximum 6 inches oc.

E. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

F. Wood Framing: Place vapor retarder on warm side of insulation by stapling at 6 inches oc. Lap and seal sheet retarder joints over member face.

G. Coordinate Work of this section with construction of air barrier seal specified in Section 07 25 00.

END OF SECTION

SECTION 07 25 00

WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Weather barrier membrane
   2. Seam Tape
   3. Flashing
   4. Fasteners

B. Related Sections:
   1. Section 07 90 00 - Joint Protection: Sealant materials and installation techniques.

1.2 REFERENCES

A. ASTM International:
   1. ASTM C920; Standard Specification for Elastomeric Joint Sealants
   2. ASTM C1193; Standard Guide for Use of Joint Sealants
   3. ASTM D882; Test Method for Tensile Properties of Thin Plastic Sheeting
   4. ASTM D1117; Standard Guide for Evaluating Non-woven Fabrics
   5. ASTM E84; Test Method for Surface Burning Characteristics of Building Materials
   6. ASTM E96; Test Method for Water Vapor Transmission of Materials
   7. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
   8. ASTM E2178; Test Method for Air Permeance of Building Materials
   9. ASTM E2357; Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

B. AATCC – American Association of Textile Chemists and Colorists
   1. Test Method 127 Water Resistance: Hydrostatic Pressure Test

C. TAPPI
   1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
   2. Test Method T-460; Air Resistance (Gurley Hill Method)

1.3 PERFORMANCE REQUIREMENTS

A. Provide continuity of air seal materials and assemblies in conjunction with materials described in other Sections

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Product Data: Submit data on material characteristics, performance criteria, and limitations
   1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements

C. Weather Barrier Warranty: Manufacturer’s executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion

1.5 QUALIFICATIONS

A. Fabricator: Company specializing in fabricating products specified in this Section with minimum five years' documented production experience similar to this Project

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products

B. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact

C. Store weather barrier materials as recommended by weather barrier manufacturer

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements

B. Maintain temperature and humidity recommended by materials manufacturers before, during and after installation

1.8 SEQUENCING

A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly

B. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation

1.9 COORDINATION

A. Section 01 31 00 – Project Management and Coordination.

B. Coordinate the Work of this section with sections referencing this section

1.10 WARRANTY

A. Section 01 77 00 - Closeout Procedures: Warranties

B. Furnish ten (10) years manufacturer warranty for weather barrier from date of final weather barrier installation

PART 2 - PRODUCTS

2.1 WEATHER BARRIERS

A. Manufacturers:
   1. DuPont (Tyvek)
   2. Grace Construction Products
   3. Rubber Polymer Corporation, Inc
   4. Substitutions: Section 01 60 00 - Product Requirements

2.2 COMPONENTS

A. Sheet: Spun-bonded polyolefin, non-woven, non-perforated
   1. Performance Characteristics:
      a. Air Penetration:
         1) 0.001 cfm/ft^2 at 75 Pa, when tested in accordance with ASTM E2178
         2) Type I per ASTM E1677
         3) ≤0.04 cfm/ft^2 at 75 Pa, when tested in accordance with ASTM E2357
      b. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E96, Method B
      c. Water Penetration Resistance: Minimum 280 cm when tested in accordance with AATCC Test Method 127

d. Basis Weight: Minimum 2.7 oz/yd^2, when tested in accordance with TAPPI Test Method T-410
e. Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460
f. Tensile Strength: Minimum 38/35 lbs/in., when tested in accordance with ASTM D882, Method A
g. Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117
h. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 10, Smoke Developed: 10

2.3 ACCESSORIES

A. Seam Tape: As recommended by the weather barrier manufacturer

B. Fasteners:
1. 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap or manufacturer approved 1-1/4" or 2" metal gasketed washer

C. Sealants: Recommended by the weather barrier manufacturer

D. Adhesives:
1. Provide adhesive recommended by weather barrier manufacturer
2. Products: Adhesives recommend by the weather barrier manufacturer

E. Primers:
1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing
2. Products: Primers recommended by the flashing manufacturer

F. Flashing
1. Flexible membrane flashing materials for window openings and penetrations recommended by manufacturer
2. Straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc. recommended by manufacturer
3. Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials
4. Preformed Inside and Outside Corners and End Dams: Preformed three-dimensional shapes to complete the flashing system used in conjunction with Thru-Wall Flashing

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 – Execution: Examination

B. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories

3.2 INSTALLATION

A. Weather Barrier
1. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations
2. Install weather barrier prior to installation of windows and doors
3. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap

4. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level
5. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer
6. Window and Door Openings: Extend weather barrier completely over openings.
7. Overlap weather barrier
    a. Exterior corners: minimum 12 inches
    b. Seams: minimum 6 inches
8. Weather Barrier Attachment:
    a. Attach weather barrier to studs through exterior sheathing.
        1) Secure using weather barrier manufacturer recommend fasteners, space 12-18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally
9. Apply flashing to weather barrier membrane prior to installing cladding anchors

B. Seaming
1. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams
2. Seal any tears or cuts as recommended by weather barrier manufacturer

C. Window Flashing
1. Preparation
    a. Flush cut weather barrier at edge of sheathing around full perimeter of opening.
    b. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing
        1) Temporarily secure weather barrier flap away from sheathing with tape
2. Flashing
    a. Cut flexible flashing a minimum of 12 inches longer than width of sill rough opening
    b. Cover horizontal sill by aligning flexible flashing edge with inside edge of sill
        1) Adhere to rough opening across sill and up jambs a minimum of 6 inches
        2) Secure flashing tightly into corners by working in along the sill before adhering up the jambs
    c. Fan flexible flashing at bottom corners onto face of wall
        1) Firmly press in place. Mechanically fasten fanned edges
    d. Apply 9-inch wide strips of flashing at jambs. Align flashing with interior edge of jamb framing
        1) Start flashing at head of opening and lap sill flashing down to the sill
    e. Spray-apply primer to top 6 inches of jambs and exposed sheathing
    f. Install flexible flashing at opening head using same installation procedures used at sill
        1) Overlap jamb flashing a minimum of 2 inches
    g. Coordinate flashing with window installation
    h. On exterior, install backer-rod in joint between window frame and flashed rough framing
        1) Apply sealant at jambs and head, leaving sill unsealed
        2) Apply sealants in accordance with sealant manufacturer’s instructions and ASTM C1193
    i. Position weather barrier head flap across head flashing
        1) Adhere using flashing over the 45-degree seams
    j. Tape top of window in accordance with manufacturer recommendations
    k. On interior, install backer rod in joint between frame of window and flashed rough framing
        1) Apply sealant around entire window to create air seal.

2) Apply sealant in accordance with sealant manufacturer's instructions and ASTM C1193

D. Thru – Wall Flashing at window head
1. Cut flap in weather barrier at window head
2. Prime exposed sheathing
3. Install lintel as required. Verify end dams extend 4 inches minimum beyond opening
4. Install end dams bedded in sealant
5. Adhere 2 inches minimum thru-wall flashing to wall sheathing
   a. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge
6. Apply sealant along thru-wall flashing edges
7. Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing
8. Tape diagonal cuts of weather barrier
9. Secure weather barrier flap with fasteners

E. Thru – Wall Flashing
1. Apply primer per manufacturer's written instructions
2. Install preformed corners and end dams bedded in sealant in appropriate locations along wall
3. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet
4. Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge
5. Roll flashing into place ensuring continuous and direct contact with substrate
6. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant
7. Terminate membrane on vertical wall
8. Apply sealant bead at each termination

3.3 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 73 00 - Execution: Protecting installed construction

B. Do not permit adjacent work to damage work of this section

END OF SECTION

SECTION 07 26 00

VAPOR RETARDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes sheet and sealant materials for controlling vapor diffusion

B. Related Sections:
   1. Section 05 40 00 - Cold-Formed Metal Framing: Wall framing
   2. Section 07 21 16 - Blanket Insulation: placement of insulation
   3. Section 07 42 13 - Wall Panels: Placement of wall panel and interior liner panels

1.2 REFERENCES

A. ASTM International:
   1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants
   2. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials

B. Green Seal:
   1. GS-36 – October 19, 2000 – Aerosol Adhesives.

C. Sealant, Waterproofing and Restoration Institute:
   1. SWRI - Sealant Specification

1.3 PERFORMANCE REQUIREMENTS

A. Vapor Retarder Permeance: Maximum 1 perm when tested in accordance with ASTM E96/E96M, desiccant method or water method

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Product Data: Submit data indicating material characteristics, performance criteria, and limitations

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with SWRI - Sealant and Caulking Guide Specification requirements for materials and installation

1.6 SEQUENCING

A. Sequence Work to permit installation of materials in conjunction with other retardant materials and seals

B. Do not install vapor retarder until items penetrating vapor retarder are in place

PART 2 - PRODUCTS

2.1 VAPOR RETARDERS

A. Manufacturers:
   1. Dow Chemical Company
   2. DuPont
   3. Reef Industries, Inc
   4. Substitutions: Section 01 60 00 - Product Requirements

2.2 COMPONENTS

A. Sheet Retarder: Clear polyethylene film for above grade application, 10 mil thick

B. Sealant: Type recommend by manufacturer

C. Primer and Backer Rods: Recommended by manufacturer to suit application

D. Cleaner: Non-corrosive type; recommended by sealant manufacturer; compatible with adjacent materials

E. Adhesive: Compatible with sheet retarder and substrate, permanently non-curing

2.3 ACCESSORIES

A. Tape: Polyethylene self-adhering type, mesh reinforced, 2 inch wide, compatible with sheet material

B. Attachments: Galvanized steel bars and anchors

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove loose or foreign matter capable of impairing adhesion

B. Clean and prime substrate surfaces to receive adhesive and sealants

3.2 INSTALLATION

A. Vapor Retarder For Stud Framed Walls:
   1. Secure sheet retarder to stud faces with adhesive
   2. Lap edges over stud faces, lap ends onto adjacent construction; calk ends with sealant to ensure complete seal

B. Vapor Retarder For Wall/Roof Junction:
   1. Lap sheet retarder from wall retarder onto roof vapor retarder continuously
   2. Seal edges and ends with sealant
   3. Calk with sealant to ensure complete seal. Position laps over firm bearing

C. Vapor Retarder Seal For Openings:
   1. Install sheet retarder between window and door frames and adjacent vapor retarder and seal with sealant
   2. Calk with sealant to ensure complete seal
   3. Position laps over firm bearing

D. Apply sealant within recommended application temperature ranges
   1. Consult manufacturer when sealant cannot be applied within these temperature ranges or where compatibility with adjacent materials may be in doubt

END OF SECTION

SECTION 07 41 13.13

FORMED METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Exposed-fastener, lap-seam, metal roof panels.

B. Related Sections:
   1. Section 07 62 00 Sheet Metal Flashing and Trim.
   2. Section 07 71 23 Manufactured Gutters and Downspouts.

1.3 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 each type of panel and accessory.

B. Shop Drawings:
   1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
   2. Accessories: Include details of the flashing, trim, and anchorage systems.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

B. Manufacturer's Warranty: Executed copy of manufacturer's standard warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Approved manufacturer with minimum five years of experience in manufacture of similar products with successfully completed projects of similar nature and scope.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

1.7 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing, cracking, or puncturing.
      b. Deterioration of metals and other materials beyond normal weathering.
   2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show 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. Two-Coat Fluoropolymer:
         1) Color fading more than 5 Hunter units when tested in accordance with ASTM D2244.
         2) Chalking in excess of a No. 6 rating when tested in accordance with ASTM D4214.
         3) 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. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing in accordance with ASTM E1592:
   1. Wind Loads: As indicated on Drawings.
   2. Other Design Loads: As indicated on Structural Drawings.
   3. Deflection Limits: For wind loads, no greater than 1/120 of the span.

2.2 EXPOSED-FASTENER, LAP-SEAM, METAL ROOF PANELS

A. General: Provide factory-formed metal roof panels designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.

B. Source Limitations: Obtain metal roof panel assembly and accessories from a single source with resources to provide fixed base roll forming, and accredited under IAS AC 472 Part B.

C. Corrugated-Profile, Exposed-Fastener Metal Roof Panels: Formed with alternating curved ribs spaced at 2.67 inches o.c. across width of panel.
   1. Manufacturers:
      a. CENTRIA Architectural Systems.
      b. Exceptional Metals.
      c. Metl-Span.
      d. MCBI – PBC Panel.
   2. Steel Sheet: Aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ55 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
      a. Nominal Thickness: 0.0212 inch or 24 gauge.
      b. Surface: Smooth finish.
      c. Exterior Finish: Two-coat fluoropolymer.
      d. Color: As selected by Architect from manufacturer's full range.
   3. Panel Coverage: 32 inches.
   4. Panel Height: 0.875 inch.

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils thick, specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer when recommended by underlayment manufacturer.
   1. Thermal Stability: Stable after testing at 220 deg F; ASTM D1970.
   2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970.
   3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Carlisle Residential; a division of Carlisle Construction Materials.
      b. CertainTeed Corporation.
      c. Drexel Metals.
      d. GCP Applied Technologies Inc.
      e. Henry Company.
      f. Kirsch Building Products, LLC.
      g. Owens Corning.

B. Felt Underlayment: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felts.

C. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.4 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C645; cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
   1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
   2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
   3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Gutters: Formed from same material as roof panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 122-inch-long sections, of size and metal thickness in accordance with SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced a maximum of 36 inches o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match metal roof panels.

E. Downspouts: Formed from same material as roof panels. Fabricate in 10-foot-long sections, complete with formed elbows and offsets, of size and metal thickness in accordance with SMACNA's "Architectural Sheet Metal Manual." Finish downspouts to match gutters.

F. Panel Fasteners: Self-tapping screws, and other acceptable corrosion-resistant fasteners recommended by roof manufacturer, designed to withstand design loads. Where exposed fasteners cannot be avoided, provide fasteners with EPDM or neoprene gaskets, with heads matching color of metal panels by means of factory-applied coating.

G. Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
   1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
   2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
      a. Concealed Joint Sealants: Non-curing butyl, AAMA 809.2.
      b. Exposed Joint Sealants: Urethane single component, ASTM C920.

3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.5 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate metal panel joints with factory-installed separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
   3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
   4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
   5. Conceal fasteners and expansion provisions where possible.
   6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
      a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

2.6 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Steel Panels and Accessories:
   1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent 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.
   2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
   1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
   2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.
      a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages in accordance with ASTM C754 and metal panel manufacturer's written recommendations.

3.3 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.
   1. Apply over the entire roof surface.
   2. Apply over the roof area indicated below:
      a. Roof perimeter for a distance up from eaves of 36 inches beyond interior wall line.
      b. Valleys, from lowest point to highest point, for a distance on each side of 18 inches. Overlap ends of sheets not less than 6 inches.
      c. Rake edges for a distance of 18 inches.
      d. Hips and ridges for a distance on each side of 12 inches.
      e. Roof-to-wall intersections for a distance from wall of 18 inches.
      f. Around dormers, chimneys, skylights, and other penetrating elements for a distance from element of 18 inches.

B. Felt Underlayment: Apply at locations indicated below, in shingle fashion to shed water, and with lapped joints of not less than 2 inches.
   1. Apply on roof not covered by self-adhering sheet underlayment. Lap over edges of self-adhering sheet underlayment not less than 3 inches, in shingle fashion to shed water.

C. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels.

D. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 07 62 00 "Sheet Metal Flashing and Trim."

3.4 METAL PANEL INSTALLATION

A. General: Install metal panels in accordance with manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   1. Shim or otherwise plumb substrates receiving metal panels.
   2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air or water-resistive barriers and flashings that are concealed by metal panels are installed.
   3. Install screw fasteners in predrilled holes.
   4. Locate and space fastenings in uniform vertical and horizontal alignment.
   5. Install flashing and trim as metal panel work proceeds.
   6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
   7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
   8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:
   1. Steel Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
   1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
   2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
   3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
   4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
   5. Flash and seal panels with weather closures at perimeter of all openings.
   6. Watertight Installation:
      a. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels and elsewhere as needed to make panels watertight.
      b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
      c. At panel splices, nest panels with minimum 4-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.

E. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal panel manufacturer; or, if not indicated, provide types recommended in writing by metal panel manufacturer.

F. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.

G. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

H. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
1. Provide elbows at base of downspouts to direct water away from building.
2. Connect downspouts to underground drainage system indicated.

I. Roof Curbs: Install flashing around bases where they meet metal roof panels.

J. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

3.5 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal panel installation, including accessories. Report results in writing.

B. Remove and replace applications where tests and inspections indicate that they do not comply with specified requirements.

C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports.

3.7 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On

completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 42 10.21

CONTINUOUS INSULATION (CI) WITH COMPOSITE FRAMING SUPPORT (CFS) SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Continuous insulation (CI) composite framing support (CFS) system integrated with metal wall panels and brick veneer.
   1. Substrate: Exterior sheathing over metal stud framing and Concrete masonry units (CMU).

1.02 RELATED REQUIREMENTS

A. Section 05 40 00 – Cold-Formed Metal Framing: Metal stud substrate support framing

B. Section 06 10 00 – Rough Carpentry: Exterior sheathing and wood stud substrate support framing

C. Section 07 90 00 – Joint Protection: Perimeter sealant

D. Section 09 21 16 – Gypsum Board Assemblies: Exterior sheathing

1.03 REFERENCE STANDARDS

A. ASCE American Society of Civil Engineers (www.asce.org)
   1. ASCE 7 – Minimum Design Loads for Buildings and Other Structures; 2010 with Supplements and Errata
   2. ASCE – Structural Plastics Design Manual

B. ASHRAE American Society of Heating, Refrigerating, and Air-Conditioning Engineers (www.ashrae.org)
   1. ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings; 2013
   2. ASHRAE 189.1 – Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings; 2014

C. ASTM International (American Society for Testing and Materials; www.astm.org)
   1. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015
   2. ASTM C209 - Standard Test Methods for Cellulosic Fiber Insulating Board; 2015
   3. ASTM C518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2015
   4. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015
   5. ASTM C1177/C1177M – Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013
   6. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2015
   7. ASTM C1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus; 2011
   8. ASTM C1396/C1396M – Standard Specification for Gypsum Board; 2014a
   9. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010e1
   10. ASTM D570 – Standard Test Method for Water Absorption of Plastics; 2010e1

11. ASTM D635 – Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2014
12. ASTM D638 – Standard Test Method for Tensile Properties of Plastics; 2014
13. ASTM D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between minus 30 degrees C and 30 degrees C with a Vitreous Silica Dilatometer; 2008e1
14. ASTM D695 – Standard Test Method for Compressive Properties of Rigid Plastics; 2015
15. ASTM D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2010
16. ASTM D792 – Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement; 2013
17. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2010
18. ASTM D2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging; 2015
19. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor; 2013a
20. ASTM D4385 - Standard Practice for Classifying Visual Defects in Thermosetting Reinforced Plastic Pultruded Products; 2013
21. ASTM E72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
22. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a
23. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2015

D. IBC – International Building Code (International Code Council); 2012

E. IECC – International Energy Conservation Code; 2015

F. IgCC – International Green Construction Code; 2012

G. NFPA – National Fire Protection Association (www.nfpa.org)
   1. NFPA 285 – Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2012

H. Voluntary Product Standard; National Institute of Standards and Technology (NIST)
   1. PS 1 – Structural Plywood; 2009

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate construction of wall cladding support system over substrate indicated for proper drainage, flashing, trim, back-up support, soffits, and other related Work.
   1. Review and finalize construction schedule.
   2. Verify availability of materials, installer's personnel, equipment, and facilities needed to maintain schedule.
   3. Review means and methods related to installation, including manufacturer's written instructions.
   4. Examine support conditions for compliance with requirements, including alignment and attachment to structural support system.
   5. Review flashings, wall cladding details, wall penetrations, openings, and condition of other construction that affects this Work.
   6. Review temporary protection requirements for during and after installation of this Work.

1.05 SUBMITTALS

A. See Section 01 33 00 – Submittal Procedures.

B. Product Data: Submit for each type of product indicated; include construction details, material descriptions, dimensions of individual components and profiles, and accessories as necessary for complete fully functioning and assembled system.

C. Test and Inspection Reports: Submit test and inspection reports on each type of wall cladding/veneer system based on evaluation of comprehensive tests performed by nationally recognized testing agency.

D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least three years of documented experience.

B. Installer: Company specializing in performing work of this section and the following:
   1. Install system in strict compliance with manufacturer’s installation instructions.
   2. Have not less than three years of documented experience.

C. Source Limitations: Obtain CI and CFS system from single source and single manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer’s original unopened containers and packaging with labels clearly identifying product name and manufacturer.

B. Deliver components and other manufactured items or accessories without damage or deformation.

C. Storage: Store materials in clean, dry, and level interior areas or outdoor areas for limited duration in accordance with manufacturer’s written instructions.

D. Protect components and auxiliary accessories during transportation, handling, and installation from moisture, excessive temperatures and other construction operations in accordance with manufacturer’s written instructions.

E. Handle components in strict compliance with manufacturer’s written instructions and recommendations, and in a manner to prevent bending, warping, twisting, and surface, edge or corner damage.

1.08 SITE CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of this Work in accordance with manufacturer's written installation instructions and warranty requirements.

1.09 WARRANTY

A. See Section 01 77 00 – Closeout Procedures: Warranties.

B. CI and CFS System Warranty: Provide written warranty by manufacturer and installer agreeing to correct defects in manufacturing within five years of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Advanced Architectural Products (A2P): SMARTci 2-in-1 System
   1. Address: 959 Industrial Drive, Allegan, Michigan 49010.
   2. Phone: (269) 355-1818; Fax: (866) 858-5568; Website: www.smartcisystems.com

B. Substituions: 01 60 00 Product Requirements

2.02 DESCRIPTION

A. CFS system components anchored to exterior sheathing over metal stud framing, or concrete masonry units (CMU).
   1. Refer to Section 04 22 00 “Concrete Masonry Unit”

B. Install CFS system components vertically on masonry or substrate system with shims or horizontally on substrate system as indicated on drawings in compliance with specified requirements.

2.03 PERFORMANCE REQUIREMENTS

A. Structural: Measure the performance of the factory formed joints using a minimum of 30 psf (ASTM E72)

B. System Thermal Design: Ensure installed CFS system, sub-framing, clips and cladding attachment does not have thermal bridging of fasteners or framing that creates a continuous metal path from exterior surface of insulation to interior face of insulation.
   1. System thermal design shall meet or exceed thermal design requirements in compliance with IECC energy code.

C. Temperature: Comply with structural loading requirements within temperature range of minus 55 degrees F to 180 degrees F.

D. Fire-Test-Response Characteristics: Provide composite framing support system with fire-test results indicated as determined by test standard indicated and applied by UL or other testing and inspection agency acceptable to authorities having jurisdiction.
   1. Surface Burning Characteristics: In compliance with ASTM E84, for foam insulation, fiber reinforced polymer (FRP) and interior surfaces as follows:
      a. Flame Spread Index (FSI): 25 or less.
      b. Smoke Developed Index (SDI): 450 or less.
   2. Intermediate Scale Multistory Fire Test: Comply with NFPA 285 and/or IBC acceptance criteria for wall height above grade and fire separation distances, when wall type and other noted conditions require such testing or compliance with requirements as indicated.

2.04 COMPOSITE FRAMING SUPPORT (CFS) SYSTEM

A. CFS System: Provide CFS system consisting of polyester and vinyl ester bioresin matrix (FRP) with recycled materials, fire retardant additives and integral continuous metal inserts the length of profile. Reinforce CFS system with glass strand rovings used internally for longitudinal (lengthwise) strength and continuous strand glass mats or stitched reinforcements used internally for transverse (crosswise) strength.
   1. Depth of GreenGirt: 2 inch high.
   2. On Center Spacing 24 inch.
   3. Provide continuous non-corrosive steel insert for engagement of fasteners, 16 gage, minimum thickness, with G90 galvanized coating designation in compliance with ASTM A653/A653M.
      a. Fully engage steel insert with adjacent CFS at ends.
      b. Anchor sub-girts and other wall cladding support accessories to steel insert set into and part of CFS.

4. Provide integral 3-point compression seal in CFS sections to ensure insulation panel will not dislodge.
5. Provide integral anti-siphon grooves on exterior and interior flanges of CFS.
6. Provide force distribution zones integrally designed into profile of CFS.
7. Provide spline seals for adjacent insulation units into profile of CFS.
8. Surface Burning Characteristics:
    a. Flame Spread Index (FSI): 25 or less, when tested in accordance with ASTM E84.
    b. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
9. Flammability: Comply with ASTM E84.
10. Self-Extinguishing: Comply with ASTM D635.
11. Profile Visual Requirements: Comply with ASTM D4385.
12. Tensile Stress: Provide engineered lengthwise and crosswise tensile stress in compliance with performance loading criteria and specified safety factors, in accordance with ASTM D638.
13. Compressive Stress: Provide engineered lengthwise and crosswise compressive stress in compliance with performance loading criteria and specified safety factors, in accordance with ASTM D695.
14. Flexural Stress: Provide engineered lengthwise and crosswise flexural stress in compliance with performance loading criteria and specified safety factors, in accordance with ASTM D790.
15. Modulus of Elasticity: Engineered to meet performance loading criteria and specified safety factors.
16. Barcol Hardness: 45, in accordance with ASTM D2583.
17. Water Absorption: Less than 0.46 percent by weight, within 24 hours, tested in accordance with ASTM D570.
18. Density: Within range of 0.062 to 0.070 lbs/cubic inch, in accordance with ASTM D792.
19. Lengthwise Coefficient of Thermal Expansion: 7.0×10^{-6} inch/inch/degrees F, in accordance with ASTM D696.
20. Notched Izod Impact, Lengthwise: 24 ft lbs/inch, in accordance with ASTM D256 within temperature range indicated.
21. Notched Izod Impact, Crosswise: 4 ft lbs/inch, in accordance with ASTM D256 within temperature range indicated.

2.05 INSULATION

A. Insulation Panel Edges: Provide factory formed edges on insulation panels that interlock with CFS system components.

B. Extruded Polystyrene (XPS) Board Insulation: Extruded polystyrene board; ASTM C578; with either natural skin or cut cell surfaces, and the following characteristics:
1. Type: ASTM C578, Type IV, 25 psi compressive strength.
2. Flame Spread Index (FSI): 25 or less, tested in accordance with ASTM E84.
3. Smoke Developed Index (SDI): 450 or less, tested in accordance with ASTM E84.
4. Thermal Resistance: 2 inch, R-Value 13.3; ASTM C518 at 75 degrees F.
5. Comply with fire-resistance requirements, as indicated on drawings, and as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
6. Board Edges: Square.
7. Water Absorption, Maximum: 0.3 percent, by volume; ASTM C578.
8. Acceptable Products:
    a. Dow Chemical Company (www.dow.com)
    b. Owens Corning Corporation (www.ocbuildingspec.com)
    c. Kingspan Insulation LLC (www.trustgreenguard.com)

2.06 ASSEMBLY

A. Assemble CFS system using manufacturer's standard procedures and processes identical to tested units and as necessary to comply with performance requirements indicated.
   1. Comply with CFS system and dimensional and structural requirements as indicated on drawings.
   2. Erect CFS system in sequence in accordance with manufacturer's standard installation procedures.
   3. Provide spray foam sealant on backside of cantilevered fasteners that completely puncture the insulation layer.

2.07 ACCESSORIES

A. Provide accessories necessary for complete CFS system including metal closure trim, transition angle, strapping, or tie-in brackets.

B. Fasteners: Corrosion-resistant, self-tapping and self-drilling screws, bolts, nuts, and other fasteners as recommended by CFS system manufacturer for project application.
   1. Cladding to CFS System: Use standard self-tapping metal screws.
   2. CFS System to Metal Stud Wall Framing: Use standard self-tapping metal screws.
   3. CFS System to Concrete/CMU: Use standard masonry or concrete screw anchors in predrilled hole.
   4. DO NOT USE powder, air, or gas actuated fasteners or actuated fastener tools. DO NOT USE impact wrenches when fastening to or from the CFS.

C. Wall Sheathing: Plywood, PS 1, Grade C-D, Exposure I.
   1. Refer to Drawings for thickness and Section 06 10 00 for additional requirements.

D. Tape: Pressure sensitive adhesive coated polypropylene woven fabric. Must be mold, water, tear and UV resistant. Must be applicable in a wide temperature range (-20 degrees F).

E. Weather Resistant Barrier (WRB): Refer to Section 07 25 00 for requirements.

F. Sealants: Provide sealants as recommended by CFS manufacturer for openings within CFS system and perimeter conditions.
   1. Refer to Section 07 90 00 for sealant information.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas of this work, and project conditions with installer present for compliance with requirements for installation tolerances, substrates, CFS system conditions, and other conditions affecting performance of this Work.

B. Examine structural wall framing to ensure that angles, channels, studs, and other structural support members have been installed within alignment tolerances required by CFS system manufacturer.

C. Examine rough-in for components and systems penetrating CFS system to coordinate actual locations of penetrations relative to CFS systems joint locations prior to installation.

D. Verify that mechanical and electrical services for exterior walls have been installed and tested and, if appropriate, verify that adjacent materials and finishes are dry and ready to receive insulation.

E. Proceed with installation only after wall substrate surfaces have been properly prepared and unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by CFS manufacturer for achieving best result for substrate under project conditions.

C. Prepare sub-framing, base angles, sills, furring, and other CFS system members and provide anchorage in accordance with ASTM C754 for substrate type and wall cladding type in accordance with manufacturer’s installation instructions.

3.03 INSTALLATION

A. Install CFS system in accordance with manufacturer's installation instructions.

B. Install system to fill-in exterior spaces without gaps or voids, and do not compress insulation panels.

C. Trim insulation neatly to fit spaces, and insulate miscellaneous gaps and voids.

D. Fit insulation tight in spaces and tight to exterior side of Mechanical/Electrical services within plane of insulation.

E. Seal gaps, voids or penetrations completely with approved expandable foam sealant on exterior and interior (if visible) before enclosing wall.

F. Provide spray foam to seal metal penetrations, including cantilevered fasteners, to prevent interstitial space condensation.

G. Exposed insulation must be protected from open flame and kept dry at all times.

H. Exterior wall insulation panels are not intended to be left exposed for periods of time in excess of 60 days without adequate protection.
   1. When extended exposure is anticipated, protect exposed insulation surfaces including corners, window and door openings with a compatible waterproof tape.

I. Install CFS system in compliance with system orientation, sizes, and locations as indicated on drawings.

3.04 TOLERANCES

A. Shim and align CFS system within installed tolerances of 1/4 inch in 20 feet, non-cumulative, level, plumb, and on location lines as indicated.

3.05 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

B. Ensure that insulation panels are not exposed to moisture.
   1. Remove wet insulation panels or allow them to completely dry prior to installation of CFS system.

C. Replace damaged insulation panels prior to Date of Substantial Completion.

END OF SECTION

SECTION 07 42 13

METAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Metal Liners Panels
   2. Related flashings and trim
   3. Accessories

B. Related Sections:
   1. Section 05 12 00 - Structural Steel Framing: Structural steel building frame
   2. Section 05 40 00 - Cold-Formed Metal Framing: Stud wall framing system
   3. Section 07 21 16 - Blanket Insulation
   4. Section 07 26 00 - Vapor Retarders: Vapor Retarders
   5. Section 07 62 00 - Sheet Metal Flashing and Trim including metal coping
   6. Section 07 90 00 - Joint Protection: Sealant at perimeter, openings, and dissimilar materials
   7. Section 08 12 14 – Standard Steel Frames: Exterior Doors
   8. Section 08 36 13 - Sectional Doors: Door Trim

1.2 REFERENCES

A. American Society of Civil Engineers:
   1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures

B. ASTM International:
   1. ASTM A755/A755M - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Pre-painted by the Coil-Coating Process for Exterior Exposed Building Products
   2. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
   3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
   4. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials

1.3 SYSTEM DESCRIPTION

A. System: Preformed and prefinished metal siding system of vertical profile; site assembled; with sub-girt framing assembly

1.4 PERFORMANCE REQUIREMENTS

A. Components: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as calculated in accordance with applicable code
   1. Design Pressure: Minimum 20 lb/sq ft

B. Maximum Allowable Deflection of Panel: 1/180 of span

C. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing

D. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system

E. Products: Provide continuity of thermal barrier at building enclosure elements in conjunction with thermal insulating materials

F. Vapor Retarder: Provide continuity of vapor retarder at building enclosure elements in conjunction with vapor retarders specified in Section 07 26 00

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Product Data: Submit data on panels

C. Samples: Submit two samples of wall panels, 2x2 inch in size illustrating finish color, sheen, and texture

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements

B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap

C. Store prefinished material off ground protected from weather, to prevent twisting, bending, or abrasion, and to provide ventilation
   1. Slope metal sheets to ensure drainage

D. Prevent contact with materials capable of causing discoloration or staining

1.8 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions

B. Coordinate Work for installation of vapor retarder and air barrier seals

C. Coordinate Work with installation of windows, doors, louvers, and adjacent components or materials

1.9 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds

B. Special Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail in materials and workmanship within one year from date of Substantial Completion

C. Special Panel Finish Warranty: On Manufacturer's standard form, in which Manufacturer agrees to repair or replace metal panels that evidence deterioration of factory-applied finish within 25 years from date of Substantial Completion, including:
   1. Fluoropolymer Two- Coat System:
      a. Color fading in excess of 5 Hunter units per ASTM D 2244
      b. Chalking in excess of No. 8 rating per ASTM D 4214
      c. Failure of adhesion, peeling, checking, or cracking
   2. Modified Silicone-Polyester Two-Coat System:

a. Color fading in excess of 5 Hunter units per ASTM D 2244, for vertical applications
b. Color fading in excess of 7 Hunter units per ASTM D 2244, for non-vertical applications
c. Chalking in excess of No. 8 rating per ASTM D 4214, for vertical applications
d. Chalking in excess of No. 6 rating per ASTM D 4214, for non-vertical applications
e. Failure of adhesion, peeling, checking, or cracking

PART 2 - PRODUCTS

2.1 METAL WALL PANELS

A. Manufacturers:
1. Arconic - Colorweb 500 Slate Grey
2. ATAS International, Inc.
3. Berridge Manufacturing Company
4. MBCI
5. Nucor Building Systems
6. Substitutions: Section 01 60 00 - Product Requirements

2.2 COMPONENTS

A. Liner Panel:
1. Pre-coated Galvanized Steel: Minimum 26 gage thick steel stock; PBC profile in 32 inch wide panels; lapped edges, manufacturer's standard edge condition
a. Pre-coated Aluminum-Zinc Alloy Coated Steel: ASTM A755/A755M; AZ 50 aluminum-zinc alloy coating; shop pre-coated with manufacturer's standard thermosetting coating
b. Pre-coated Surfaces: Color: white

B. Miscellaneous Sheet Materials:
1. Pre-coated Galvanized Steel: Minimum 24 gage thick steel stock.
a. Aluminum-Zinc Alloy Coated Steel: ASTM A792/A792M Commercial - CQ Quality, Coating Designation AZ 50 aluminum-zinc alloy coating
b. Pre-coated Surfaces: Color as selected from manufacturer's standard range

C. Insulation:
1. Type specified in Section 07 21 16

D. Sub-girts: manufacturer's standard profile as indicated on Drawings; to attach panel system to structural frame

E. Thickness as required to support specified loads within specified deflection limitations

F. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; brake formed to required angles

G. Expansion Joints:
1. Same material, thickness and finish as exterior sheets; manufacturer's standard brake formed type, of profile to suit system
2. Exposed fasteners same finish as panel system

H. Trim, Closure Pieces, Caps, Flashings: Same material, thickness and finish as exterior sheets; brake formed to required profiles

I. Anchors: Type recommend by panel manufacturer

2.3 ACCESSORIES

A. Sealants:

1. Manufacturer's standard type suitable for use with installation of system
2. Color as selected to match siding

B. Fasteners:
1. Manufacturer's standard type to suit application; with soft neoprene washers; fastener cap same color as exterior panel
2. Exposed fasteners same finish as panel system

C. Power Actuated Fasteners: Steel, hot dip galvanized; with soft neoprene washers, fastener cap same color as exterior panel

D. Field Touch-up Paint: As recommended by panel manufacturer

E. Bituminous Paint: Asphalt base

2.4 FABRICATION

A. Form sections to shape indicated on Drawings, accurate in size, square, and free from distortion or defects

B. Form pieces in longest practicable lengths

C. Panel Profile: Manufacturer’s standard profile for specified system

D. Fabricate corners in one continuous piece with minimum 18 inch returns

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions

B. Verify building framing members are ready to receive panel system

3.2 INSTALLATION

A. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint
1. Allow to dry prior to installation

B. Fasten siding to structural supports; aligned, level, and plumb

C. Locate joints over supports. Lap panel ends minimum 2 inches.

D. Install expansion or control joints where indicated

E. Use manufacturer recommend fasteners unless otherwise approved by Architect

F. Seal to prevent weather penetration
1. Maintain neat appearance

3.3 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances

B. Maximum Offset From Indicated Alignment Between Adjacent Members Butting or In Line: 1/16 inch

C. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch

3.4 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning

B. Remove site cuttings from finish surfaces

C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water

END OF SECTION

SECTION 07 61 00

SHEET METAL ROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes pre-finished galvanized sheet steel roofing, associated flashings
   1. Underlayment.
   2. Fascias and soffit panels.
   3. Counterflashings.

1.2 REFERENCES

A. ASTM International:
   1. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
   2. ASTM E 408- Standard Test Method for Total Normal Emittance of Surface Using Inspection - Meter Techniques.
   3. ASTM E 408- Standard Test Method for Solar Absorptance, Using Integrating Spheres.
   4. ASTM E 1514 - Standard Specification for Structural Standing Steel Roof Panel systems.
   5. ASTM E 1680-95 - Standard Test Method for Rate of Air Leakage through Exterior Roof Panel System.
   6. ASTM E 1646-95 - Standard Test Method for Water Penetration through Exterior Roof Panel System.

B. Sheet Metal and Air Conditioning Contractors:
   1. SMACNA - Architectural Sheet Metal Manual.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Product Data: Submit data on metal types, finishes, and characteristics.

D. Samples:
   1. Submit two samples 8 inch long in size illustrating metal roofing illustrating typical seam, material, and finish.
   2. Submit two samples 2 x 2 inch in size illustrating all metal finish colors.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with SMACNA Architectural Sheet Metal Manual, except as otherwise noted.

1.5 QUALIFICATIONS

A. Installer: Company specializing in sheet metal roof installations with minimum three years documented experience and certified by manufacturer.

1.6 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials causing discoloration or staining.

1.8 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

1.9 WEATHERTIGHTNESS WARRANTY

A. The Contractor shall provide to the Owner, a Standard warranty signed by the roofing manufacturer of the Standing Seam Roof System as outlined below:

B. Single Source Warranty: Single Source Warranties require a certified install on site at all times.
   1. For a period of: twenty (20) years from the date of substantial completion, the roofing manufacturer WARRANTS to the Building Owner ("Owner"): to furnish roof panels, flashing and related items used to fasten the roof panels and flashing including roof jack and curb attachments to the roof structure, will not allow intrusion of water from the exterior of the roofing manufacturer's Roof System into the building envelope when exposed to ordinary weather conditions and ordinary wear and usage. The Date of substantial completion is the date that is certified by the Architect, Owner, or Owner's Representative, when the roofing manufacturer's Roofing System is completed and accepted by or on behalf of the Owner.
   2. Manufacturer's Field Service
      a. During installation, provide for two on-site inspections of roof application by qualified technical representative of the manufacturer.
      b. Upon completion of installation, provide final inspection by a technical representative of roofing manufacturer to confirm that roofing system has been installed in accordance with manufacturer's requirements.
   3. The roofing manufacturer shall have the SOLE AND EXCLUSIVE obligation for all warranty work commencing on the date of substantial completion and under all circumstances terminates on the twenty (20) year anniversary of the date certified as Substantial Completion of the roofing manufacturer's Roof System. During the period in which the roofing manufacturer has any warranty obligation, the roofing manufacturer shall take appropriate actions necessary to cause the non-performing portions of the Roof System to perform their proper functions.
   4. Roofing Manufacturer's Liability:
      a. The total liability of the roofing manufacturer under Single Source Warranty is:
         1) Single Source III, a no dollar limit of the manufactures Roof System as invoiced to the roofing manufacturer's customer.

PART 2 PRODUCTS

2.1 SOFFIT PANEL

A. Manufacturers
1. ATAS International, Inc.
2. Butler Manufacturing Company
3. MBCI
4. Metal Sales MFG. Co.
5. Fabral
6. Garland Co Inc.
7. Substitution: Section 01 60 00 Product Requirements

B. Product Description:
1. Panel profile: Perforated 12" exposure with grooves at 4" on center, 1-1/2" deep, with concealed fasteners and interlocking side lap
2. Gauge: 22 gauge.
3. Substrate: Galvulume steel sheet, minimum yield of 50,000 PSI.
4. Texture: Smooth.
5. Finish: Signature 300 Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin.
6. Color: Select from manufacturer full line of colors.

2.2 FASCIA PANEL

A. Manufacturers
1. ATAS International, Inc.
2. Butler Manufacturing Company
3. MBCI
4. Metal Sales MFG. Co.
5. Fabral
6. Garland Co Inc.
7. Substitution: Section 01 60 00 Product Requirements

B. Product Description:
1. Panel profile: 12" exposure width, 1-1/2" deep, with concealed fasteners and interlocking side lap
2. Gauge: 22 gauge.
3. Substrate: Galvulume steel sheet, minimum yield of 50,000 PSI.
4. Texture: Smooth.
5. Finish: Signature 300 Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin.
6. Color: Select from manufacturer full line of colors.

2.3 FASCIA AND FLASHING

A. Fascia, trim and flashing shall be 24 gauge pre finished Galvulume steel to match roof panel color, shape as shown on drawing.

2.4 ACCESSORIES

A. Fasteners: Type recommended by roofing manufacturer.

B. Underlayment: Type II No. 30 unperforated asphalt felt (Contractor's option).

C. Ice & Water shield: Self-adhered, rubberized asphalt underlayment.

D. Sealant: Type recommended by manufacturer.

E. Plastic Cement: ASTM D4586, Type I.

2.5 FABRICATION

A. Form sections shape as indicated on Drawings, accurate in size, square, and free from distortions or defects.

B. Fabricate clips and cleats of same material as sheet, to interlock with sheet.

C. Fabricate starter strips of same material as sheet, continuous, to interlock with sheet.

D. Form pieces in single length sheets.

E. Hem exposed edges on underside 1/2 inch; miter and seam corners.

F. Form material with standing batten seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

G. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

H. Fabricate vertical faces with bottom edge formed outward ½ inch and hemmed to form drip.

I. Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.

J. With finish system, as recommended by finish system manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, and properly sloped eaves.

C. Verify deck is dry and free of snow and ice. Verify joints in wood deck are solidly supported and fastened.

D. Verify correct placement of wood nailers.

E. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, and nailing strips located.

F. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. Fill knot holes and surface cracks with latex filler at areas of bonded eave protection.

B. Broom clean deck surfaces under eave protection and underlayment.

C. Install starter and edge strips, and cleats before starting installation.

D. Back paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

A. Ice Dam Membrane Installation:

1. Place eave edge and gable edge metal flashings tight with fascia boards. Weather lap joints minimum 2 inches and seal with plastic cement. Secure flange with nails at maximum 12 inches on center.
2. Install ice dam membrane parallel with eave edge, flush with face of eave edge flashing with edges lapped shingle style and ends lapped and staggered between rows.
3. Extend ice dam membrane minimum 4 ft up-slope beyond interior face of exterior wall.

B. General Roofing Installation Requirements:
1. Apply underlayment over entire roof area in single layer laid perpendicular to slope; weather lap edges 2 inches and nail in place. Minimize nail quantity.
2. Cleat and seam joints.
3. Use plastic cement for joints between metal and bitumen and for joints between metal and felts.
4. Provide formed metal pans for protrusions through roof. Fill pans watertight with plastic cement.

C. Fascia and soffit panels
1. Conform to SMACNA - Architectural Sheet Metal Manual drawing details.
2. Install fascia and soffit according to manufacturer's instructions
3. Install soffit panels with joints perpendicular to the exterior wall
4. Coordinate installation with installation of roofing system and base flashings.
5. Coordinate installation of sealants ensure water tightness.
6. Coordinate installation of flashing flanges into reglets.

D. Flashing Installation:
1. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
2. Cleat and seam joints.
3. Apply plastic cement compound between metal flashings and felt flashings.
4. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
5. Seal metal joints watertight.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Do not permit traffic over unprotected roof surface

C. Do not allow panels or trim to come in contact with dissimilar metals such as copper, lead or graphite. Water run-off from these materials is also prohibited. This specifically includes condensate from roof top units.

3.5 CLEANING

A. Dispose of excess materials and remove debris from site.

B. Clean work in accordance with manufacturer's recommendations.

C. Protect work against damage until final acceptance. Replace or repair to the satisfaction of the architect (owner), any work that becomes damaged prior to final acceptance.

D. Touch up minor scratches and abrasions with touch up paint supplied by the metal roof system manufacturer.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
1. Flashings and counterflashings
2. Fabricated sheet metal items
3. Reglets and accessories

B. Related Sections:
1. Section 07 90 00 - Joint Protection

1.2 REFERENCES

A. American Architectural Manufacturers Association:
1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum
2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels

B. ASTM International:
1. ASTM A625/A625M - Standard Specification for Tin Mill Products, Black Plate, Single Reduced
2. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
3. ASTM A755/A755M - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Pre-painted by the Coil-Coating Process for Exterior Exposed Building Products
4. ASTM B32 - Standard Specification for Solder Metal
5. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
6. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products
7. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
8. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free

C. FM Global:
1. FM DS 1-28 - Wind Loads to Roof Systems and Roof Deck Securement.
2. FM 4435 - Edge Systems Used with Low Slope Roofing Systems
3. FM 4470 - Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied roof Assemblies for use in Class 1 and Noncombustible Roofs Deck Construction

D. Federal Specification Unit:
1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant

E. Sheet Metal and Air Conditioning Contractors:
1. SMACNA - Architectural Sheet Metal Manual

1.3 DESIGN REQUIREMENTS

A. Sheet Metal Flashings: Conform to the following criteria of SMACNA "Architectural Sheet Metal Manual"

B. Gutter and Downspout Components: Conform to SMACNA Manual for sizing components for rainfall intensity determined by storm occurrence of 1 in 5 years

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details

C. Product Data: Submit data on manufactured components metal types, finishes, and characteristics

D. Samples:
   1. Submit two samples illustrating metal finish color

1.5 QUALIFICATIONS

A. Fabricator and Installer: Company specializing in sheet metal work with minimum three years documented experience

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation
   1. Slope metal sheets to ensure drainage

C. Prevent contact with materials causing discoloration or staining

1.7 COORDINATION

A. Section 01 31 00 – Project Management and Coordination

B. Coordinate with Work of Section 04 22 00 for installing recessed flashing reglets

PART 2 - PRODUCTS

2.1 SHEET METAL FLASHING AND TRIM

A. Galvanized Steel: ASTM A653/A653M; structural steel sheet, G90 zinc coating; 0.024 inch thick steel

B. Pre-Finished Galvanized Steel Sheet: ASTM A755/A755M; structural steel sheet, G90 zinc coating; 0.024 inch thick core steel, shop pre-coated with silicone polyester or two coat fluoropolymer top coat; color as selected from manufacturer's standard color as selected

2.2 ACCESSORIES

A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers

B. Primer: Zinc molybdate or type

C. Protective Backing Paint: Zinc molybdate alkyd or FS TT-C-494, Bituminous

D. Sealant: Compatible with flashing and metal trim materials

E. Plastic Cement: ASTM D4586, Type I

F. Reglets: Recessed type, galvanized steel or rigid extruded PVC; face and ends covered

with plastic tape

G. Solder: ASTM B32; type suitable for application and material being soldered

2.3 FABRICATION

A. Form sections shape indicated on Drawings, accurate in size, square, and free from distortion or defects

B. Fabricate cleats of same material as sheet metal, interlocking with sheet

C. Form pieces in longest possible lengths

D. Hem exposed edges on underside 1/2 inch; miter and seam corners

E. Form material with flat lock seams, except where otherwise indicated
   1. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams

F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant

G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip

H. Fabricate flashings to allow toe to extend 2 inches over roofing

I. Return and brake edges

J. Seal metal joints

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution: Coordination and project conditions

B. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located

C. Verify roofing termination and base flashings are in place, sealed, and secure

3.2 PREPARATION

A. Install starter and edge strips, and cleats before starting installation

B. Install surface mounted reglets to lines and levels indicated on Drawings
   1. Seal top of reglets with sealant

C. Paint concealed metal surfaces with protective backing paint to minimum dry film thickness of 15 mil

3.3 INSTALLATION

A. Insert flashings into reglets to form tight fit
   1. Secure in place with lead or plastic wedges
   2. Seal flashings into reglets with sealant

B. Secure flashings in place using concealed fasteners
   1. Use exposed fasteners only where permitted

C. Apply plastic cement compound between metal flashings and felt flashings

D. Fit flashings tight in place
   1. Make corners square, surfaces true and straight in planes, and lines accurate to profiles

E. Seal metal joints watertight

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing

B. Inspection will involve surveillance of Work during installation to ascertain compliance with specified requirements

END OF SECTION

SECTION 07 71 00

ROOF SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:
   1. Attic vents and ridge vent.
   2. Snow guards for metal roofs and attachment system

B. Related Sections:
   1. Section 07 61 00 Sheet Metal Roofing: Roof system and flashings.
   2. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings.
   3. Section 07 71 23 - Manufactured Gutters and Downspouts.

1.2 REFERENCES

A. ASTM International:
   1. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.

B. National Roofing Contractors Association:
   1. NRCA - The NRCA Roofing and Waterproofing Manual.

C. Sheet Metal and Air Conditioning Contractors:
   1. SMACNA - Architectural Sheet Metal Manual.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.

C. Product Data: Submit data on shape of components, materials and finishes, anchor types and locations.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with SMACNA or NRCA details.

1.5 WARRANTY

A. Section 01 77 00 - Closeout Procedures: Warranties.

B. Furnish manufacturer standard warranty.

PART 2 PRODUCTS

2.1 RIDGE VENT

A. Manufacturers:
   1. Air Vent, Inc
   2. COR-A-VENT, Inc. Model: V-400E
   3. Trimline Building Products.
   4. GAF Material Corp.
   5. Substitutions: Section 01 60 00 - Product Requirements.

B. Components
1. Ridge Vents: Linear type with enhanced snow screen; plastic, formed to permit installation with indicated roofing and shed water. Fabricate with 17 sq in minimum net free area of ventilation.
2. Attic Vents: Dome type; aluminum color coated sheet metal, formed to permit installation with indicated roofing and shed water. Fabricate with 38 sq in minimum free area of ventilation.

2.2 SNOW GUARD

A. Manufacturers:
1. Metal Roof Innovations, Ltd., Model S-5! ColorGard
2. Substitutions: Section 01 60 00 - Product Requirements.

B. Components
1. Clamps:
a. Manufactured from 6061-T6 aluminum extrusions conforming to ASTM B221 or aluminum castings conforming to ASTM B85 and to AA Aluminum Standards and Data.
b. Clamp model: compatible with roof style
c. Set screws: 300 Series stainless steel, 18-8 alloy, 3/8 inch diameter, with round nose point.
d. Attachment bolts: 300 Series stainless steel, 18-8 alloy, 10 mm diameter, with flat washers
2. Cross Members:
a. Manufactured from 6061-T6 alloy and temper aluminum extrusions conforming to ASTM B221 and AA Aluminum Standards and Data.
b. Receptacle in face to receive color-matched metal strips.
c. Provide splice connectors ensuring alignment and structural continuity at end joints.
3. Color Strips: Same material and finish as roof panels; obtained from roof panel manufacturer
4. Snow and Ice Clips: Aluminum, with rubber foot, minimum 3 inches wide.

2.3 ACCESSORIES

A. Sealant: Manufacturer's standard type suitable for use with installation of system.

B. Roofing Cement: ASTM D4586, Fibrated cutback asphalt type, free of toxic solvents.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution: Coordination and project conditions.

B. Verify deck, asphalt shingles, base flashing, and other items affecting Work of this section are in place and positioned correctly.

C. Prior to beginning installation of snow guards, verify that:
1. Panel seaming is complete.
2. Panel attachment is sufficient to withstand loads applied by snow guard system.
3. Installation will not impede roof drainage.

3.2 PREPARATION

A. Clean areas to receive attachments; remove loose and foreign matter that could interfere with installation or performance.

3.3 INSTALLATION

A. Coordinate installation of components of this section with installation of metal roofing and flashings.

B. Coordinate installation of sealants and roofing cement with Work of this section to ensure water tightness.

C. Snow guard:
1. Install system in accordance with manufacturer's instructions and approved Shop Drawings.
2. Place clamps at maximum 32 inches on center or as required by in-service loads.
3. Place clamps in straight, aligned rows.
4. Place both set screws on same side of clamp.
5. Tighten set screws to manufacturer's recommended torque. Randomly test set screw torque using calibrated torque wrench.
6. Insert color-matched metal strips into cross members, staggering strips to cover cross member joints.
7. Attach cross members to clamps; tighten bolts to manufacturer's recommended torque.
8. Install splice connectors at cross member end joints.
9. Do not cantilever cross members more than 4 inches beyond last clamp at ends.
10. Install two SnoClips per panel between panel seams.

END OF SECTION

SECTION 07 71 23

MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes pre-finished galvanized steel or pre-finished aluminum gutters and downspouts.
   1. Provide precast concrete splash.

B. Related Sections:
   1. Section 07 62 00 - Sheet Metal Flashing and Trim.
   2. Section 07 90 00 - Joint Protection.

1.2 REFERENCES

A. American Architectural Manufacturers Association:
   1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
   2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
   3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
   4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

B. ASTM International:
   1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   2. ASTM B32 - Standard Specification for Solder Metal.
   3. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

C. Federal Specification Unit:
   1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.

D. Sheet Metal and Air Conditioning Contractors:
   1. SMACNA - Architectural Sheet Metal Manual

1.3 DESIGN REQUIREMENTS

A. Conform to SMACNA Manual for sizing components for rainfall intensity determined by storm occurrence of 1 in 5 years.

B. Conform to applicable code for size and method of rain water discharge.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

C. Product Data: Submit data on manufactured components, materials, and finishes.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with SMACNA Manual or CDA Handbook.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope to drain.

C. Prevent contact with materials during storage capable of causing discoloration, staining, or damage.

1.7 COORDINATION

A. Section 01 31 00 – Project Management and Coordination.

B. Coordinate Work with downspout discharge pipe inlet.

1.8 WARRANTY

A. Section 01 77 00 - Closeout Procedures: Warranties.

B. Furnish manufacturer warranty for gutter and downspout finishes.

PART 2 PRODUCTS

2.1 GUTTERS AND DOWNSPOUTS

A. Product Description:
   1. Gutters: Sheet metal; Rectangular style profile.
   2. Downspouts: as shown on drawings.
   3. Splash Pads: Precast concrete type, size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

2.2 COMPONENTS

A. Pre-Finished Galvanized Steel Sheet: ASTM A653/A653M, G90 zinc coating; 24 gage core steel, shop pre-coated with modified silicone coating; color as selected from manufacturer's standard colors.

B. Pre-Finished Aluminum Sheet: ASTM B209, manufacturer’s standard alloy and temper for specified finish; 0.032 inch thick; plain stucco embossed finish shop pre-coated with modified silicone coating; color as selected from manufacturer's standard colors.

2.3 ACCESSORIES

A. Anchors and Supports: Profiled to suit gutters and downspouts.
   1. Anchoring Devices: In accordance with CDA or SMACNA requirements.
   2. Gutter Supports: Brackets or Straps.

B. Fasteners: Same material and finish as gutters and downspouts.

C. Primer: Zinc molybdate or Galvanized iron type.

D. Protective Backing Paint: Zinc molybdate alkyd.

2.4 FABRICATION

A. Form gutters and downspouts of profiles and sizes indicated.

B. Fabricate with required connection pieces.

C. Form sections to shape indicated on Drawings, square, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.

D. Hem exposed edges of metal.

E. Fabricate gutter and downspout accessories; seal watertight.

2.5 FACTORY FINISHING

A. Modified silicone polyester coating: Baked enamel system conforming to AAMA 2603.

B. Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution: Coordination and project conditions.

B. Verify surfaces are ready to receive gutters and downspouts.

3.2 PREPARATION

A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

A. Sheet Metal: Join lengths with seams sealed watertight. Flash and seal gutters to downspouts and accessories.

B. Slope gutters 1/8 inch per foot minimum.

C. Set splash pads under downspouts. Secure in place.

END OF SECTION

SECTION 07 90 00

JOINT PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes sealants and joint backing, precompressed foam sealers, hollow gaskets, and accessories.

B. Related Sections:
1. Section 08 80 00 - Glazing: Glazing sealants and accessories.

1.2 REFERENCES

A. ASTM International:
1. ASTM C834 - Standard Specification for Latex Sealants.
2. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
3. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
4. ASTM C1193 - Standard Guide for Use of Joint Sealants.
5. ASTM D1056 - Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
6. ASTM D1667 - Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
7. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing Work of this section with minimum three years experience.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.6 COORDINATION

A. Section 01 31 00 – Project Management and Coordination

B. Coordinate Work with sections referencing this section.

PART 2 PRODUCTS

2.1 JOINT SEALERS

A. Manufacturers:
   1. Dow Corning Corp.
   2. GE Silicones.
   3. Pecora Corp.
   4. Sika Corp.
   5. Tremco Sealants & Waterproofing.
   6. Substitutions: Section 01 60 00 - Product Requirements Not Permitted.

B. Products Description:
   1. High Performance General Purpose Exterior (Non-traffic) Sealant: Silicone, Polyurethane, or Polysulfide; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single or multi- component.
      a. Color: Colors as selected.
      b. Applications: Use for:
         1) Control, expansion, and soft joints in masonry.
         2) Joints between concrete and other materials.
         3) Joints between metal frames and other materials.
      c. Other exterior non-traffic joints for which no other sealant is indicated.
   2. Exterior Foam Expansion Joint Sealer: Pre-compressed foam sealer; Polyurethane with water-repellent
      a. Color: Face color as selected.
      b. Size: As required to provide weathertight and watertight seal when installed.
      c. Applications: Use for exterior wall expansion joints
   3. Exterior Compressible Gasket Expansion Joint Sealer: ASTM D2628, hollow neoprene (polychloroprene) compression gasket.
      a. Color: Black color.
      b. Size and Shape: As indicated on Drawings.
      c. Applications: Use for exterior wall expansion joints.
   4. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, non-drying, non-skinning, non-curing.
      a. Applications: Use for concealed sealant bead in sheet metal work and concealed sealant bead in siding overlaps.
   5. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, single component, paintable.
      a. Color: Colors as selected.
      b. Applications: Use for interior wall and ceiling control joints, joints between door and window frames and wall surfaces, and other interior joints for which no other type of sealant is indicated.
      c. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
   6. Bathtub/Tile Sealant: White silicone; ASTM C920, Uses M and A; single component, mildew resistant.
      a. Applications: Use for joints between plumbing fixtures and floor and wall surfaces, and joints between kitchen and toilet room counter tops and wall surfaces.
      b. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.

2.2 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
   1. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant

manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded rubber; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution

B. Verify substrate surfaces and joint openings are ready to receive work.

C. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

A. Remove loose materials and foreign matter impairing adhesion of sealant.

B. Clean and prime joints.

C. Perform preparation in accordance with ASTM C1193.

D. Protect elements surrounding Work of this section from damage or disfiguration.

3.3 INSTALLATION

A. Perform installation in accordance with ASTM C1193.

B. Perform acoustical sealant application work in accordance with ASTM C919.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

G. Tool joints concave.

3.4 CLEANING

A. Section 01 77 00 - Closeout Procedures: Final cleaning.

B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 73 00 - Execution: Protecting installed construction.

B. Protect sealants until cured.

END OF DIVISION

5 YR
ROOFING WARRANTY

WHEREAS_____

of (Address) _____

herein called the "Roofing Contractor", has performed roofing and associated ("work") on following project:

Owner: _____

DPW Project No. _____

Address: _____

Name and Type of Building: _____

Address: _____

Area of Work: _____ Date of Acceptance: _____

Warranty Period: **Five (5) years** Date of Expiration: _____

AND WHEREAS Roofing Contractor 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 Roofing Contractor 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 watertight condition. In addition to making the work watertight, the Roofing Contractor shall remove and/or repair blisters, ridges, flashings, splits and other irregularities which in the opinion of the Roofing Manufacturer's technical representative do not conform to acceptable roofing practices and conditions. These repairs shall be made prior to expiration of the five (5) year Warranty Period and to the satisfaction of the Roofing Manufacturer's technical representative.

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, windstorm; b) fire; c) failure of roofing system substrate including cracking, settlement, excessive deflection, deterioration, and decomposition; d) faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work; and e) activity on roofing 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 Roofing Contractor, and until cost and expense thereof has been paid by Owner or by another responsible party so designated.

2. The Roofing Contractor 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.

3. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Contractor, 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 upon date of said alterations, but only to extent said alterations affect work covered by this Warranty. If Owner engages Roofing Contractor to perform said alterations, Warranty shall not become null and void, unless Roofing Contractor, prior to proceeding with said work, shall claim that said alterations would like damage or deteriorate work, thereby reasonably justifying a limitation or termination of this warranty.

4. 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 upon date of said change, but only to extent said change affects work covered by this Warranty.

5. The Owner shall promptly notify Roofing Contractor of observed, known or suspected leaks, defect or deterioration, and shall afford reasonable opportunity for Roofing Contractor to inspect work, and to examine evidence of such leaks, defects or deterioration.

6. This Warranty is recognized to be the only Warranty of Roofing Contractor on said work, and is in addition to the Roofing Guarantee furnished by the Roofing Manufacturer, and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to him in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Contractor of responsibility for performance of

original work in accordance with 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 _____, 20_____

Cosigned by General Contractor by:

_____	_____
(General Contractor)	(Roofing Contractor)
_____	_____
(Business Address)	(Business Address)
_____	_____
(Signature)	(Signature)
_____	_____
(Title)	(Title)

DIVISION 08 OPENINGS

SECTION 08 12 14

STANDARD STEEL FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes fire rated non-rated steel frames.

B. Related Sections:
1. Section 08 13 14 - Standard Steel Doors.
2. Section 08 14 16 - Flush Wood Doors.
3. Section 08 71 00 - Door Hardware: Hardware, silencers, and weatherstripping.
4. Section 08 80 00 - Glazing.

1.2 REFERENCES

A. American National Standards Institute:
1. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.

B. ASTM International:
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. National Fire Protection Association:
1. NFPA 80 - Standard for Fire Doors, Fire Windows.
2. NFPA 105 - Standard for the Installation of Smoke Door Assemblies and other Opening Protectives.
3. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.

D. Underwriters Laboratories Inc.:
1. UL 10B - Fire Tests of Door Assemblies.
2. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
3. UL 1784 - Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate frame elevations, reinforcement, anchor types and spacing, location of cut-outs for hardware, and finish.

C. Product Data: Submit frame configuration and finishes.

1.4 QUALITY ASSURANCE

A. Conform to requirements of ANSI A250.8.

B. Fire Rated Frame Construction: Conform to NFPA 252.

C. Installed Fire Rated Frame Assembly: Conform to NFPA 80 for fire rated class same as fire door.
1. Air Leakage: Maximum 3.0 cfm/sf of door opening with 0.10 inch water gage pressure differential.

D. Attach label from agency approved by authority having jurisdiction to identify each fire rated door frame.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Accept frames on site in manufacturer's packaging. Inspect for damage.

C. Break seal on-site to permit ventilation.

1.7 COORDINATION

A. Section 01 73 00: Execution

B. Coordinate Work with frame opening construction, door, and hardware installation.

C. Sequence installation to accommodate required door hardware electric wire connections.

PART 2 PRODUCTS

2.1 STANDARD STEEL FRAMES

A. Manufacturers:
1. Amweld Building Products, Inc.
2. Ceco Door Products Model.
3. Republic Builders Products.
4. Steelcraft.
5. Substitutions: Section 01 60 00 - Product Requirement.

B. Product Description: Standard shop fabricated steel frames, fire rated and non-rated types.
1. Frames: To suit ANSI A250.8 Grade and Model of door specified in Section 08 13 14.
2. Exterior Frames:
   a. Level 3 for Door Models 1, nominal 16 gage/0.053 inch thick material, base metal thickness.
3. Interior Frames:
   a. Level 3 for Door Models 1, nominal 16 gage/0.053 inch thick material, base metal thickness.

2.2 ACCESSORIES

A. Bituminous Coating: Non-asbestos fibered asphalt emulsion.

B. Primer: ANSI A250.10 rust inhibitive type.

C. Silencers: Resilient rubber set in steel fitted into drilled hole.

D. Weatherstripping: Specified in Section 08 71 00.

2.3 FABRICATION

A. Fabricate frames as welded unit for gypsum board slip on type, except for exterior.

B. Fabricate frames with hardware reinforcement plates welded in place.

C. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.

D. Prepare frames for silencers. Provide three single silencers for single doors on strike side. Provide two single silencers on frame head at double doors without mullions.

E. Attach fire rated label to each fire rated frame.

2.4 SHOP FINISHING

A. Steel Sheet: Galvanized to ASTM A653/A653M A60.

B. Primer: Baked.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00: Execution

B. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install frames in accordance with ANSI A250.8.

B. Coordinate with gypsum board wall construction for anchor placement.

C. Coordinate installation of glass and glazing specified in Section 08 80 00.

D. Coordinate installation of frames with installation of hardware specified in Section 08 71 00 and doors in Section 08 13 14.

3.3 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

3.4 SCHEDULE

A. Refer to Door Schedule.

END OF SECTION

SECTION 08 13 14

STANDARD STEEL DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes non-rated, fire rated, and thermally insulated steel doors

B. Related Sections:
   1. Section 08 12 14 - Standard Steel Frames
   2. Section 08 71 00 - Door Hardware
   3. Section 08 80 00 - Glazing: Glass for doors
   4. Section 09 90 00 - Painting and Coating: Field painting of doors

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames

B. ASTM International:
   1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
   2. ASTM C1363 - Standard Test Method for the Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus
   3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

C. Hollow Metal Manufacturers Association:
   1. HMMA 810 - Hollow Metal Doors

D. National Fire Protection Association:
   1. NFPA 80 - Standard for Fire Doors, Fire Windows
   2. NFPA 105 - Standard for the Installation of Smoke Door Assemblies and other Opening Protectives
   3. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies

E. Steel Door Institute:
   1. SDI 108 - Recommended Selection and Usage Guide for Standard Steel Doors

F. Underwriters Laboratories Inc.:
   1. UL 10B - Fire Tests of Door Assemblies
   2. UL 10C - Positive Pressure Fire Tests of Door Assemblies
   3. UL 1784 - Air Leakage Tests of Door Assemblies

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals

B. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, and cut-outs for glazing, and finishes

C. Product Data: Submit door configurations, location of cut-outs for hardware reinforcement

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ANSI A250.8

B. Fire Rated Door Construction: Conform to NFPA 252

C. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings

D. Smoke and Draft Control Doors: Tested in accordance with UL 1784 and installed in accordance with NFPA 105
   1. Air Leakage: Maximum 3.0 cfm/sf of door opening with 0.10 inch water gage pressure differential

E. Attach label from agency approved by authority having jurisdiction to identify each fire rated door
   1. Attach smoke label to smoke and draft control doors

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products

B. Protect doors with resilient packaging sealed with heat shrunk plastic

C. Accept doors on site and inspect for damage

D. Break seal on site to permit ventilation

1.7 COORDINATION

A. Section 01 73 00: Execution

B. Coordinate Work with door opening construction, door frame, and door hardware installation

C. Coordinate installation to accommodate door hardware electric wire connections

PART 2 - PRODUCTS

2.1 STANDARD STEEL DOORS

A. Manufacturers:
   1. Amweld International, LLC
   2. Ceco Door
   3. Curries Company
   4. Republic Doors and Frames
   5. Steelcraft
   6. Substitutions: Section 01 60 00 - Product Requirements

B. Product Description:
   1. Exterior Doors (Insulated): ANSI A250.8, SDI 108, 1-3/4 inch thick
      a. Level 3 - Extra heavy Duty, Model 1, full flush design
   2. Interior Doors (Non-Rated): ANSI A250.8, SDI 108, 1-3/4 inch thick
      a. Level 3 - Extra heavy Duty, Model 1, full flush design
   3. Interior Doors (Fire Rated): ANSI A250.8, SDI 108, 1-3/4 inch thick
      a. Level 3 - Extra heavy Duty, Model 1, full flush design

2.2 COMPONENTS

A. Face: Steel sheet in accordance with ANSI A250. SDI 108

B. End Closure: Channel, 0.04 inches thick, flush

C. Core:
   1. Exterior doors: polyurethane and vertical steel stiffeners
   2. Interior doors: steel channel grid and vertical steel stiffeners

D. Thermal Insulated Door: Total insulation R-Value of 14, measured in accordance with ASTM C1363

2.3 ACCESSORIES

A. Removable Stops: Rolled steel, channel shape, mitered corners; prepared for countersink style tamper proof screws

B. Astragals for Double Doors: Steel, T shaped, specifically for double doors

C. Primer: ANSI A250.10 rust inhibitive type

2.4 FABRICATION

A. Fabricate doors with hardware reinforcement welded in place

B. Attach astragal to one leaf of pairs of fire rated doors

2.5 SHOP FINISHING

A. Steel Sheet: Galvanized to ASTM A653/A653M A60

B. Primer: Baked

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution: Verification of existing conditions before starting work

B. Verify opening sizes and tolerances are acceptable

3.2 INSTALLATION

A. Install doors in accordance with ANSI A250.8

B. Install door louvers, plumb and level

C. Coordinate installation of glass and glazing specified in Section 08 80 00

D. Coordinate installation of doors with installation of frames specified in Section 08 12 14 and hardware specified in Section 08 71 00

E. Touch-up damaged shop finishes

3.3 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner

3.4 ADJUSTING

A. Section 01 73 00 - Execution: Requirements for adjusting

B. Adjust door for smooth and balanced door movement

3.5 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings

END OF SECTION

SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes flush wood doors; flush and flush glazed configuration; non-rated.

B. Related Sections:
   1. Section 08 12 14 - Standard Steel Frames.
   2. Section 08 71 00 - Door Hardware.
   3. Section 08 80 00 - Glazing.
   4. Section 09 90 00 - Painting and Coating: Site finishing of wood doors.

1.2 REFERENCES

A. Architectural Woodwork Institute:
   1. AWI - Quality Standards Illustrated.

B. Hardwood Plywood and Veneer Association:
   1. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, and special blocking for hardware, factory machining criteria, identify cutouts for glazing.

C. Product Data: Submit information on door core materials and construction, and on veneer species, type and characteristics.
   1. Submit two samples of door veneer, 6 x 6 inch in size illustrating wood grain, stain color, and sheen.

D. Manufacturer's Installation Instructions: Submit special installation instructions.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with AWI Quality Standard Section 1300, Premium Grade. Finish doors in accordance with AWI Quality Standard Section 1500.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges when stored more than one week.
   1. Break seal on site to permit ventilation.

1.7 COORDINATION

A. Section 01 31 00 – Project Management and Coordination

B. Coordinate Work with door opening construction, door frame and door hardware installation.

1.8 WARRANTY

A. Section 01 77 00 - Closeout Procedures: Warranties.

B. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

C. Furnish manufacturer's "Life of Installation" warranty for interior doors.

PART 2 PRODUCTS

2.1 FLUSH WOOD DOORS

A. Manufacturers:
   1. Algoma Hardwoods Inc.
   2. Eggers Industries.
   3. Marshfield Door Systems.
   4. Mohawk Flush Doors, Inc.
   5. Oshkosh Architectural Door Co.
   6. Substitutions: Section 01 60 00 - Product Requirements.

B. Product Description: Solid core flush wood doors; wood veneer facing material; fire rated and non-rated types; flush glazed design; factory finished wood doors.
   1. Flush Interior Doors: 1-3/4 inches thick; solid core, seven ply construction, fire rated as indicated on Drawings.

2.2 COMPONENTS

A. Solid Core, Non-Rated: AWI Section 1300, SCL Structural Composite Lumber.

B. Interior Veneer Facing: AWI Custom quality wood, rotary cut, with center balanced match book matched grain, for transparent finish. Pair match multiple door leaves in single opening.
   1. Wood: Maple.

C. Facing Adhesive: Type II - water resistant.

2.3 ACCESSORIES

A. Glazing Stops: Wood, of same species as door facing, mitered corners; prepared for countersink style screws.

2.4 FABRICATION

A. Fabricate doors in accordance with AWI Quality Standards requirements.

B. Astragals for Double Doors: Treated wood, T shaped, overlapping and recessed at face edge, specifically for double doors.

C. Furnish lock blocks at lock edge and top of door for closer for hardware reinforcement.

D. Vertical Exposed Edge of Stiles: Of same species as veneer facing.

E. Fit door edge trim to edge of stiles after applying veneer facing.

F. Bond edge banding to cores.

G. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Furnish solid blocking for through bolted hardware.

H. Cut and configure exterior door edge to receive recessed smoke seals devices.

I. Provide edge clearances in accordance with AWI 1300.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution

B. Verify opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

A. Install doors in accordance with AWI Quality Standards requirements.

B. Trim non-rated door width by cutting equally on both jamb edges.

C. Trim door height by cutting bottom edges to maximum of 3/4 inch.

D. Machine cut doors for hardware installation.

E. Coordinate installation of doors with installation of frames specified in Section 08 12 14 and hardware specified in Section 08 71 00.

F. Install door louvers plumb and level.

G. Coordinate installation of glass and glazing specified in Section 08 80 00.

H. Factory finish doors.

3.3 INSTALLATION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Conform to AWI requirements for fit and clearance tolerances.

C. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over imaginary 36 x 84 inches surface area.

D. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over imaginary 36 x 84 inches surface area.

E. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over imaginary 36 x 84 inches surface area.

3.4 ADJUSTING

A. Section 01 73 00 - Execution: Starting and adjusting.

B. Adjust door for smooth and balanced door movement.

C. Adjust closer for full closure.

3.5 SCHEDULE

A. Refer to Door Schedule on Drawings.

END OF SECTION

SECTION 08 36 13

SECTIONAL DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes electric overhead sectional door and operating hardware,

1.2 REFERENCES

A. ASTM International:
   1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   2. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
   3. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

B. Door and Access Systems Manufacturers Association International:
   1. DASMA 102 - Specifications for Sectional Overhead Type Doors.

C. National Electrical Manufacturers Association:
   1. NEMA MG 1 - Motors and Generators.

D. National Fire Protection Association:
   1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

E. Underwriters Laboratories Inc.:
   1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 SYSTEM DESCRIPTION

A. Panels: Flush steel, insulated.

B. Lift Type: Standard lift operating style with lift clearance track and hardware.

C. Operation: Electric.

D. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall to design pressure of 20 lb/sq ft.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.

C. Product Data: Submit component construction, anchorage method, and hardware.

D. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 77 00 - Closeout Procedures.

B. Operation and Maintenance Data:
   1. Include electrical control adjustment recommendations.

2. Include data for motor and transmission, shaft and gearing, lubrication frequency, periodic adjustments required, and spare part sources.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with DASMA 102, Application Type Commercial.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified.

C. Surface Burning Characteristics:
1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with NFPA 255 UL 723.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years experience approved by manufacturer.

1.8 WARRANTY

A. Section 01 77 00 - Closeout Procedures: Warranties.

B. Furnish five year manufacturer warranty for electric operating equipment.

PART 2 PRODUCTS

2.1 SECTIONAL OVERHEAD DOORS

A. Manufacturers:
1. Raynor Garage Door Model Tricore Standard.
2. Overhead Door.
3. Midland Garage Door MFG. CO.- 3” Energy Saver Doors
4. Wayne Dalton
5. American Garage Door Supply Inc
6. Substitutions: Section 01 60 00 - Product Requirements.

B. Product Description: Steel overhead sectional doors, electric operation, stock configuration and hardware.
1. Door Nominal Thickness: 3 inches thick.

2.2 MAINTENANCE SHED DOOR OPERATOR

A. Provide doors designed for manual chain hoist operation and electric motor operation.

B. Manufacturer Product Designation:
1. Raynor Control Hoist 2.0 Optima:
2. Type: Jackshaft
3. Motor Horsepower Rating: Continuous HP as determined by manufacturer for size of door.
4. Electrical Requirements: 115 Volt Single Phase.
5. Duty Cycle: 30 cycles/hour.
6. Control Wiring: 24 volt control with provisions for connection of safety edge to reverse and external radio control hook-up. Three button momentary contact “open-close-stop”.

C. Wire Doors to open independently.

2.3 BRINE PRODUCTION FACILITY DOOR OPERATOR

A. Provide doors designed for manual chain hoist operation and electric motor operation.

B. Manufacturer Product Designation:
   1. American Garage Door Supply Inc.: Smart Jack
   2. Type: SmartJack V3 VFD Electric Garage Door Operator
   3. Motor Horsepower Rating: Continuous HP as determined by manufacturer for size of door.
   4. Electrical Requirements: 120 Volt Three Phase.
   5. Control Box & Sensors:
      a. NEMA 4X Enclosure
      b. Auto/hand switch & disconnect handle mounted on cover
      c. Integrated proximity sensor for position monitoring
      d. Home sensor calibrates fully-closed position
      e. VFD controls speed & direction while reducing start-up electrical demand.
      f. Open, Close & Stop buttons mounted on cover

2.4 MAINTENANCE SHED DOOR SECTIONS

A. Material: Steel sandwich construction, 3 inches (76.2 mm) thick, roll from commercial quality, hot-dipped galvanized steel ASTM A 924 and ASTM 653. Exterior and interior section skins to be constructed of 25 gauge steel (0.017 inch minimum thickness) embossed stucco texture, mechanically interlocked and pressure bonded to a 2-7/8 inches (73 mm) thick, expanded polystyrene core. Hinge reinforcement plates shall be of 14 gauge edge plates and 16 gauge center plates, located within section interior at every hinge location. End stiles to be 14 gauge, separated from the exterior skin by a vinyl thermal break.

B. Mounting: Sections mounted in door opening using Lap Jamb Angel Mounting: section overlap door jambs by 1 inch (25 mm) on each side of door opening Between-Jamb Bracket Mounting: sections mounted between door jambs, seal against perimeter seal installed along vertical and top horizontal edges of jambs.

C. Insulation: Expanded polystyrene, R-value of 16.05 and U-valve of 0.0623.

D. Seals: Interior and exterior skins to be separated by continuous dual durometer vinyl seal held in place by mechanical interlock to form thermal break and complete weatherseal along section joint. Top of door to be provided with EPDM rubber sealing strip. Bottom of door to have flexible U-shape vinyl seal retained in aluminum rail.

E. Trussing: Floors designed to withstand specified windload. Deflection of door in horizontal position to be maximum of $1/120^{th}$ of door width.

F. Color: Exterior skin to have two coats of paint, one primer coat and one finish coat. Color as selected by architect from manufacturer full range of colors.

G. Windows: Locations to comply with door elevation drawings. 36 inches by 14 inches full view (square –edge) window encased in an extruded PVC frame where shown on drawings.

H. Glazing: Windows to be provided with 5/8 inch (16 mm) thick insulated glazing units as follows:
   1. Acrylic consisting of two panes of 1/8 inch (3.2 mm) thick acrylic Plexiglass

2.5 BRINE PODUCTION FACILITY 3 INCH FULL VISION DOOR SECTIONS

1. Material: Comprised of 6063-T6 aluminum alloy extrusion wall thickness of 0.062 inch. Stiles and rails joined together with 1/4" rods. If required aluminum filler panels 1/8" thickness of 6063-T6 alloy. PVC glazing strips.
   a. 3” Thick
   b. Top rail 1 5/8 inch

c. Bottom rail 1 5/8 inch
d. Wide rail 4 5/8 inch
e. End stile 3 9/16 inch
f. Center stile 2 3/4 inch

2. Seals:
   a. Bottom of door to have flexible U-shaped vinyl seal retained in aluminum rail
   b. Provide blade seal on top section to prevent airflow above header
   c. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length
3. Trussing: Doors designed to withstand specified wind load
   a. Deflection of door in horizontal position to be maximum of 1/120th of door width
4. Windows: Locations to comply with door elevation drawings
   a. Glazing: Windows to be provided with insulated glazing units as follows:
      1) 5/8” Five X-Wall Polycarbonate Panel
5. Mounting: Sections mounted in door opening using:
   a. Lap Jamb Angle Mounting: section overlap door jambs by 1 inch (25 mm) on each side of door opening

2.6 MAINTENANCE SHED TRACK

A. Material: Hot-dipped galvanized steel (ASTM A-653), fully adjustable for adequate sealing of door to jamb or weatherseal.

B. Configuration Type: Lift-Standard

C. Size: 3 inches.

D. Mounting: Floor-to-Shaft Angle-Mount consisting of continuous angle extending from the floor, past header, completely up to door shaft for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 5 inches x 3/32 inch on 2-inch track.

E. Finishing: Galvanized Steel

2.7 BRINE PODUCTION FACILITY TRACK

A. Material: Heavy duty stainless steel, fully adjustable for adequate sealing of door to jamb or weatherseal.

B. Configuration Type: Lift-Standard

C. Size: 3 inches.

D. Mounting: Floor-to-Shaft Angle-Mount consisting of continuous angle extending from the floor, past header, completely up to door shaft for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 5 inches x 3/32 inch on 2-inch track.

E. Finishing: Stainless Steel

2.8 MAINTENANCE SHED COUNTERBALANCE SYSTEM

A. Type: Provided with aircraft-type, galvanized steel lifting cables with minimum safety factor of 5. Torsion Springs consisting of heavy-duty oil-tempered wire torsion springs on a continuous ball-bearing cross-header shaft, Weight Counterbalance for lift clearance and vertical lift type configurations.

2.9 BRINE PRODUCTION FACILITY COUNTERBALANCE SYSTEM

A. Type: Provided with aircraft-type, 5/32” Stainless steel lifting cables with minimum safety factor of 5. Torsion Springs consisting of heavy-duty oil-tempered wire torsion springs on a continuous ball-bearing cross-header shaft, Weight Counterbalance for lift clearance and vertical lift type configurations.

2.10 MAINTENANCE SHED HARDWARE

A. Hinges and Brackets: Fabricated from galvanized steel.

B. Track Rollers: 3 inches diameter consistent with track size, with hardened steel ball bearings.

C. Perimeter Seal: Provide complete weather stripping systems to reduce air infiltration. Weather stripping shall be replaceable without removal of track, mounting hardware, or door hardware. For bracket mounted doors provide climate seal or vinyl seal with aluminum retainer.

D. Locks: Furnish door system with exterior lock key to building keying system.

2.11 BRINE PRODUCTION FACILITY HARDWARE

A. Hinges and Brackets: Fabricated from stainless steel.

B. Track Rollers: 3 inches diameter consistent with track size, with hardened steel ball bearings.

C. Perimeter Seal: Provide complete weather stripping systems to reduce air infiltration. Weather stripping shall be replaceable without removal of track, mounting hardware, or door hardware. For bracket mounted doors provide climate seal or vinyl seal with aluminum retainer.

D. Locks: Furnish door system with exterior lock key to building keying system.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution

B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.

C. Verify electric power is available and of correct characteristics.

3.2 PREPARATION

A. Prepare opening to permit correct installation of door unit to perimeter air and vapor retarder seal.

3.3 INSTALLATION

A. Anchor assembly to wall construction and building framing without distortion or stress.

B. Securely brace door tracks suspended from structure. Secure tracks to structural members only.

C. Fit and align door assembly including hardware.

D. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

E. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 90 00.

F. Install perimeter weatherstripping.

3.4 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation from Plumb: 1/16 inch.

C. Maximum Variation from Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.

E. Maintain dimensional tolerances and alignment with adjacent work.

3.5 ADJUSTING

A. Section 01 73 00 - Execution: Starting and adjusting.

B. Adjust door assembly to smooth operation and in full contact with weatherstripping.

3.6 CLEANING

A. Section 01 77 00 - Closeout Procedures: Final cleaning.

B. Clean doors, frames and glass.

C. Remove temporary labels and visible markings.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 73 00 - Execution: Protecting installed construction.

B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

SECTION 08 53 13

VINYL WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Single hung vinyl windows.

1.2 RELATED SECTIONS

A. Section 06 10 00 – Rough Carpentry: Wood framed openings.

B. Section 07 25 00 – Weather Barriers.

C. Section 08 80 00 - Glazing.

1.3 REFERENCES

A. American Architectural Manufacturers Association (AAMA):
   1. AAMA 502 – Voluntary Specification for Field Testing of Windows and Sliding Doors.

B. ASTM International:
   1. ASTM C 1036 – Flat Glass.
   2. ASTM C 1048 – Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
   3. ASTM D 3656 – Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.
   4. ASTM E 283 – Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
   5. ASTM E 547 – Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential.

C. Screen Manufacturers Association (SMA):
   1. SMA 1201 – Specifications for Insect Screens for Windows, Sliding Doors and Swinging Doors.

D. Window and Door Manufacturers Association (WDMA):
   1. ANSI/AAMA/NWWDA 101/I.S.2 – Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.

1.4 PERFORMANCE REQUIREMENTS

A. Windows shall meet Rating HS-LC30-50 specifications in accordance with ANSI/AAMA/NWWDA 101/I.S.2.

B. Window Air Leakage, ASTM E 283: Window air leakage when tested at 1.57 psf (25 mph) shall be 0.25 cfm/ft^2 of frame or less.

C. Window Water Penetration, ASTM E 547: No water penetration through window when tested under static pressure of 4.5 psf (42 mph) after 4 cycles of 5 minutes each, with water being applied at a rate of 5 gallons per hour per square foot.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit manufacturer's product data, including installation instructions.

C. Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections and locations, anchorage methods and locations,

hardware locations, and installation details.

D. Samples: Submit sample illustrating vinyl windows, glazing system, quality of construction, and color of finish.

E. Warranty: Submit manufacturer’s standard warranty.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance ANSI/AAMA/NWWDA 101/I.S.2 – Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.

B. Factory Testing: Factory test individual standard operable windows for air infiltration in accordance with ASTM E 283, to ensure compliance with this specification.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements

B. Delivery: Deliver materials to site undamaged in manufacturer's or sales branch's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name. Include installation instructions.

C. Storage:
1. Store materials in accordance with manufacturer's instructions.
2. Store materials off ground and under cover.
3. Protect materials from weather, direct sunlight, and construction activities.

D. Handling: Protect materials and finish during handling and installation to prevent damage.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Do not install sealants or glazing materials when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.9 COORDINATION

A. Section 01 31 00 – Project Management and Coordination

B. Coordinate the Work with installation of air barrier, components or materials.

1.10 WARRANTY

A. Section 01 77 00 - Closeout Procedures: Warranties.

B. Furnish five year manufacturer warranty for glazed units.

PART 2 PRODUCTS

2.1 VINYL SILDING WINDOWS

A. Manufacturers
1. Gerkin Windows & Doors, Model: 6000 Horizontal Slider
2. Marvin: Ultrex
3. Milgard Manufacturing, Inc., Model: Montecito Series
4. Pella Corporation, Model; 25 Series
5. Serious Materials Inc: Model: 600 Series
6. Weather Shield Mfg, Inc., Model Visions 3000 Series
7. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONET

A. Vinyl Windows:
   1. Factory-assembled windows with sash installed in frame.
   2. Frame and Sash Material: Extruded, rigid polyvinylchloride (PVC).

B. Frame:
   1. New construction frame with integral fin.
   2. Overall Frame Depth: 3-3/8 inches for 2-inch wall depth.
   3. Nominal Wall Thickness, Vinyl Members: 0.065 inch to 0.075 inch.
   4. Frame Corners:
      a. Mitered.
      b. Heat-fused, fully welded corners.
   5. Sill: Fitted with weeps.

C. Sash:
   1. Vent Sash: Removable for cleaning exterior glass.
   2. Sash Corners:
      a. Mitered.
      b. Heat-fused, fully welded corners.

D. Glazing:
   1. Specified in Section 08 80 00.

E. Weather Stripping:
   1. Vent Sash: Dual weather-stripped around perimeter with fin-type, dual-pile, and weatherstripping.

2.3 ACCESSORIES

A. Insect Screens:
   1. Compliance:
      a. ASTM D 3656.
      b. SMA 1201.
   2. Screen Cloth: Full-size with black vinyl coated 18/16 mesh, fiberglass screen cloth set in aluminum frame fitted to outside of window.
   3. Complete with necessary hardware.
   4. Screen Frame Finish: Baked enamel.
   5. Color: Match window exterior.

B. Flashing/Sealant Tape:
   1. Aluminum-foil-backed butyl window and door flashing tape.
   2. Maximum Total Thickness: 0.013 inch.
   3. UV resistant.
   4. Verify sealant compatibility with sealant manufacturer.

C. Insulating-Foam Sealant: Dow Chemical Great Stuff Window and Door Insulating Foam Sealant.
   1. Low-pressure, polyurethane window and door insulating-foam sealant.

2.4 HARDWARE

A. Factory-installed zinc die cast, self aligning, automatic lock located on the meeting rail.

B. Vents are equipped with two nylon roller housings containing two acetal rollers each.

2.5 FINISH

A. Window Frame and Sash Vinyl Extrusions: Integral color throughout profile.

B. Exposed Surfaces: Smooth, glossy, and uniform in appearance.

C. Color: As selected from manufacturer’s full range of colors.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution

B. Examine areas to receive vinyl windows. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install vinyl windows in accordance with manufacturer's instructions.

B. Install vinyl windows to be weather-tight and freely operating.

C. Maintain alignment with adjacent work.

D. Secure assembly to framed openings, plumb and square, without distortion.

E. Integrate vinyl window installation with exterior weather-resistant barrier using flashing/sealant tape. Apply and integrate flashing/sealant tape with weather-resistant barrier using watershed principles in accordance with window manufacturer's instructions.

F. Seal vinyl windows to exterior wall cladding with sealant and related backing materials at perimeter of assembly.

G. Place interior seal around vinyl window perimeter to maintain continuity of building thermal and air barrier using insulating-foam sealant.

H. Leave vinyl windows closed and locked.

3.3 FIELD QUALITY CONTROL

A. Field Testing: Field test vinyl windows in accordance with AAMA 502, Test Method

3.4 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Windows shall accommodate the following opening tolerances:
   1. Horizontal Dimensions Between High and Low Points: Plus 1/4 inch, minus 0 inch.
   2. Width Dimensions: Plus 1/4 inch, minus 0 inch.
   3. Building Columns or Masonry Openings: Plus or minus 1/4 inch from plumb.

3.5 CLEANING

A. Section 01 77 00 - Closeout Procedures: Final cleaning.

B. Clean vinyl windows in accordance with manufacturer's instructions.

C. Do not use harsh cleaning materials or methods that would damage finish or glass.

D. Remove labels and visible markings.

E. Keep window tracks clear of dirt and debris.

F. Keep weep holes open and clear of obstructions.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 73 00 - Execution: Protecting installed construction.

B. Protect installed vinyl windows to ensure that, except for normal weathering, windows will be without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes hardware for wood and steel doors.
   1. Provide door gaskets, including weatherstripping and seals, and thresholds.

B. Related Sections:
   1. Section 08 13 14 - Standard Steel Doors.
   2. Section 08 14 16 - Flush Wood Doors.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI A156.1 - Butts and Hinges.
   2. ANSI A156.2 - Bored and Preassembled Locks and Latches.
   3. ANSI A156.3 - Exit Devices.
   4. ANSI A156.4 - Door Controls - Closures.
   5. ANSI A156.5 - Auxiliary Locks and Associated Products.
   6. ANSI A156.6 - Architectural Door Trim.
   7. ANSI A156.7 - Template Hinge Dimensions.
   8. ANSI A156.12 - Interconnected Locks and Latches.
   9. ANSI A156.16 - Auxiliary Hardware.
   10. ANSI A156.18 - Materials and Finishes.

B. Builders Hardware Manufacturers Association:
   1. BHMA Directory of Certified Products.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings:
   1. Indicate locations and mounting heights of each type of hardware, schedules, and catalog cuts.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 77 00 - Closeout Procedures.

B. Project Record Documents: Record actual locations of installed cylinders and their master key code.

C. Operation and Maintenance Data: Submit data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

D. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with the following requirements:
   1. ANSI A156 series.
   2. NFPA 80.
   3. UL 305.

B. Furnish hardware marked and listed in BHMA Directory of Certified Products.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Hardware Supplier: Company specializing in supplying commercial door hardware with minimum three years documented experience. Approved by primary hardware manufacturer Hardware Supplier Personnel: Employ Architectural Hardware Consultant (AHC) qualified person to assist in work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Package hardware items individually with necessary fasteners, instructions, and installation templates, when necessary; label and identify each package with door opening code to match hardware schedule.

1.8 COORDINATION

A. Section 01 31 00 – Project Management and Coordination

B. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.
   1. Provide templates or actual hardware as required to ensure proper preparation of doors and frames.

1.9 WARRANTY

A. Section 01 77 00 – Closeout Procedures: Warranties.

B. Furnish five year manufacturer warranty for locksets and door closers.

1.10 MAINTENANCE MATERIALS

A. Section 01 78 23 – Operation and Maintenance Data

B. Furnish special wrenches and tools applicable for each different and for each special hardware component.

C. Furnish maintenance tools and accessories supplied by hardware component manufacturer.

1.11 EXTRA MATERIALS

A. Section 01 78 23 – Operation and Maintenance Data: Spare parts and maintenance products.

B. Furnish two extra key for each master keyed group.

PART 2 PRODUCTS

2.1 DOOR HARDWARE

A. Hinge Manufacturers:
   1. Hager Companies.
   2. McKenney.
   3. Stanley Hardware.
   4. Substitutions: Section 01 60 00 - Product Requirements.

B. Lockset , Latch Set , and Cylinder Manufacturers:
   1. Best Access Systems.
   2. Substitutions: Section 01 60 00 - Product Requirements.

C. Exit Device Manufacturers:
   1. Hager Companies.
   2. Sargent Manufacturing Company.
   3. Von Duprin, Inc.
   4. Yale Commercial Locks and Hardware.
   5. Substitutions: Section 01 60 00 - Product Requirements.

D. Cylinder Manufacturers:
   1. Best Access Systems.
   2. Substitutions: Section 01 60 00 - Product Requirements.

E. Controlled Access
   1. As called out on drawings.
   2. No substitutions permitted

F. Closers Manufacturers:
   1. Corbin Russwin Architectural Hardware, Inc.
   2. Hager Companies
   3. LCN Closers.
   4. Norton Door Control.
   5. Substitutions: Section 01 60 00 - Product Requirements.

G. Push/Pulls, Manual and Automatic Bolts, Protection Plates, Gaskets, Thresholds, and Trim Manufacturers:
   1. Hager Companies.
   2. Ives Commercial Hardware.
   3. National Guard Products.
   4. Pemko Manufacturing Co.
   5. Zero International, Inc.
   6. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

A. General Hardware Requirements: Where not specifically indicated, comply with applicable ANSI A156 standard for type of hardware required. Furnish each type of hardware with accessories as required for applications indicated and for complete, finished, operational doors.
   1. Templates: Furnish templates or physical hardware items to door and frame manufacturers sufficiently in advance to avoid delay in Work.
   2. Reinforcing Units: Furnished by door and frame manufacturers; coordinated by hardware supplier or hardware manufacturer.
   3. Fasteners: Furnish as recommended by hardware manufacturer and as required to secure hardware.
      a. Finish: Match hardware item being fastened.

B. Hinges: ANSI A156.1, full mortise type complying with following general requirements unless otherwise scheduled.
   1. Widths: Sufficient to clear trim projection when door swings 180 degrees.
   2. Number: Furnish minimum three hinges to 90 inches high, four hinges to 120 inches high for each door leaf.
      a. Fire Rated Doors to 86 inches High: Minimum three hinges.
      b. Doors over 40 inches Wide: Extra heavy weight ball or oilite bearing hinges.
      c. Doors 1-3/4 inch Thick: 4 inch size.
      d. Doors 2 inch Thick: 5 inch extra heavy weight ball or oilite bearing.
      e. Doors over 48 inches Wide: 5 inch extra heavy weight ball or oilite bearing.
   3. Pins: Furnish nonferrous hinges with non-removable pins (NRP) at exterior and locked out swinging doors, non-rising pins at interior doors.

4. Tips: Flat button tips with matching plug.

C. Locksets: Furnish locksets compatible with specified cylinders. Typical 2-3/4 inch backset. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt verify type of cutouts provided in metal frames.
   1. Cores: 7 pin IC

D. Key Pad Access Control Devices: Furnish fully operational exit rim and cylindrical key pad locks.
   1. Best Access: EZ Series
      a. Variable pin length 3-6 digits
      b. Keying 7 pin IC
      c. Maximum 50 users
      d. Programming performed through key pad

E. Latch Sets: Match locksets. Typical 2-3/4 inch backset. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt verify type of cutouts provided in metal frames.

F. Exit Devices: ANSI A156.3, Grade 1 rim type, with cross bar, unless otherwise indicated. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt verify type of cutouts provided in metal frames,
   1. Types: Suitable for doors requiring exit devices.

G. Cylinders: ANSI A156.5, Grade 1, interchangeable core type cylinders.
   1. Keying: 7 Pin IC.
   2. Include construction keying.
   3. Keys: Nickel silver. Stamp keys with “DO NOT DUPLICATE”.
   4. Supply keys in the following minimum quantities:
      a. 5 master keys.
      b. 3 grand master keys.
      c. 3 great grand master keys.
      d. 3 construction keys.
      e. 3 control keys and 3 extra cylinder cores.
      f. 2 change keys for each lock.

H. Closers: ANSI A156.4 modern type with cover, surface mounted closers; full rack and pinion type with steel spring and non-freezing hydraulic fluid; closers required for fire rated doors unless otherwise indicated.
   1. Adjustability: Furnish controls for regulating closing, latching, speeds, and back checking.
   2. Arms: Type to suit individual condition; parallel-arm closers at reverse bevel doors and where doors swing full 180 degrees.
   3. Location: Mount closers on inside of exterior doors, room side of interior doors typical; mount on pull side of other doors.
   4. Operating Pressure: Maximum operating pressure as follows.
      a. Interior Doors: Maximum 5 pounds.
      b. Exterior Doors: Maximum 8.5 pound.
      c. Fire Rated Doors: As required for fire rating, maximum 15 pounds.

I. Push/Pulls, Manual Bolts, Protection Plates, Gaskets, Thresholds, and Trim: Furnish as indicated in Schedule, with accessories as required for complete operational door installations.
   1. Push/Pulls: ANSI A156.6; push plates minimum 0.050 inch thick. Furnish straight push-pull type pulls with bolts to secure from opposite door face; furnish with minimum 0.050 inch pull plates unless otherwise indicated.
   2. Manual Bolts: ANSI A156.16 Grade 1 top and bottom surface bolts, with dust-proof floor strike, unless otherwise indicated.

3. Kickplates: ANSI A156.6, metal; height indicated in Schedule by 2 inch less than door width; minimum 0.050 inch thick stainless steel.
4. Weatherstripping: Furnish continuous weatherstripping at top and sides of exterior doors.
5. Thresholds: Maximum 1/2 inch height.
6. Wall Stops: ANSI A156.1, Grade 1, concave pad wall stop with no visible screws.

2.3 ACCESSORIES

A. Lock Trim: Furnish levers with as selected from manufacturer's full range of levers and roses.
   1. Do not permit through bolts on solid wood core doors.

B. Through Bolts: Do not permit through bolts and grommet nuts on door faces in occupied areas unless no alternative is possible.
   1. Do not uses through bolts on solid wood core doors.

2.4 FINISHING

A. Finishes: ANSI A156.18; furnish following finishes except where otherwise indicated in Schedule at end of section.
   1. Hinges:
      a. As indicated on Drawings
   2. Typical Exterior Exposed and High Use Interior Door Hardware:
      a. As indicated on Drawings
   3. Typical Interior Door Hardware:
   4. Match Existing Hardware Closers: Finish appearance to match door hardware on same face of door.
      a. As indicated on Drawings
   5. Thresholds: Finish appearance to match door hardware on exterior face of door.
      a. As indicated on Drawings
   6. Other Items: Furnish manufacturer's standard finishes to match similar hardware types on same door, and maintain acceptable finish considering anticipated use and BHMA category of finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution

B. Verify doors and frames are ready to receive door hardware and dimensions are as indicated on shop drawings.

3.2 INSTALLATION

A. Coordinate mounting heights with door and frame manufacturers. Use templates provided by hardware item manufacturer.

B. Mounting Heights from Finished Floor to Center Line of Hardware Item: Comply with manufacturer recommendations and applicable codes where not otherwise indicated.
   1. Locksets: 38 inch.
   2. Push/Pulls: 42 inch.
   3. Dead Locks: 48 inch.
   4. Cross Bar Type Exit Devices: 38 inch.
   5. Top Hinge: Jamb manufacturer's standard, but not greater than 10 inches from head of frame to center line of hinge.
   6. Bottom Hinge: Jamb manufacturer's standard, but not greater than 12-1/2 inches from floor to center line of hinge.

7. Intermediate Hinges: Equally spaced between top and bottom hinges and from each other.

3.3 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

3.4 ADJUSTING

A. Section 01 73 00 - Execution: Starting and adjusting.

B. Adjust hardware for smooth operation.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 73 00 - Execution: Protecting installed construction.

B. Do not permit adjacent work to damage hardware or hardware finish.

3.6 SCHEDULES

A. Refer to Door Schedule in Drawings

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Glass glazing for metal frames, doors, windows, and glazed walls.

B. Related Sections:
   1. Section 07 90 00 - Joint Protection: Sealant and back-up material other than glazing sealants.
   2. Section 08 13 14 - Standard Steel Doors.
   3. Section 08 14 16 - Flush Wood Doors: Glazed doors.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI Z97.1 - Safety Glazing Materials Used in Buildings Safety.

B. ASTM International:
   1. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
   2. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
   3. ASTM C1036 - Standard Specification for Flat Glass.
   4. ASTM C1193 - Standard Guide for Use of Joint Sealants.
   5. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
   6. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
   7. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
   8. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.

C. Consumer Products Safety Commission:
   1. CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing.

D. Glass Association of North America:
   1. GANA - Sealant Manual.
   2. GANA - Glazing Manual.
   3. GANA - Laminated Glass Design Guide.

E. National Fenestration Rating Council Incorporated:
   1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors.
   2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

F. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems.

1.3 PERFORMANCE REQUIREMENTS

A. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier:
   1. In conjunction with materials described in 07 90 00.
   2. To utilize inner pane of multiple pane sealed units for continuity of air barrier and vapor retarder seal.

3. To maintain continuous air barrier and vapor retarder throughout glazed assembly from glass pane to heel bead of glazing sealant. Structural Design: Design in accordance with applicable code for most critical combination of wind, snow, seismic, and dead loads.

B. Wind Loads: Design and size glass to withstand positive and negative wind loads acting normal to plane of wall, including increased loads at building corners.

C. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with applicable code.

D. Exterior Glass Deflection: Maximum of 1/175 of glass edge length or 3/4 inch, whichever is less with full recovery of glazing materials.

E. Interior Glass Deflection: Maximum differential deflection for two adjacent unsupported edges when 50 plf forces is applied to one panel at any point up to 42 inches above finished floor less than thickness of glass.

F. Thermal and Solar Optical Performance: Measured or calculated in accordance with the following:
1. Maximum U-Values: Comply with ICC IEEC for climate zone in which project is located. Measure in accordance with NFRC 100.
2. Maximum SHGC: Comply with ICC IEEC for climate zone in which project is located. Measure in accordance with NFRC 200.
3. Solar Optical Properties: NFRC 300.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data:
1. Glass: Provide structural, physical, and thermal and solar optical performance characteristics, size limitations, and special handling or installation requirements.
2. Glazing Sealants, Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors were exposed.

C. Samples:
1. Glass: Submit two samples 6 x 6 inch in size, illustrating each glass units, coloration and design.

D. Manufacturer's Certificate: Certify sealed insulating glass, meets or exceeds specified requirements.

E. Installer's Certificate: Certify glass furnished without identification label is installed in accordance with Construction Documents and applicable code.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual, GANA Sealant Manual, and GANA Laminated Glass Design Guide for glazing installation methods.

1.6 QUALIFICATIONS

A. Installer: Company specializing in performing Work of this section with minimum three years experience approved by manufacturer.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Do not install glazing when ambient temperature is less than 50 degrees F.

C. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8 WARRANTY

A. Section 01 77 00 - Closeout Procedures: Warranties.

B. Furnish ten year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Glass
1. ACH Glass Operations.
2. AFG Industries, Inc.
3. Guardian Industries Corp.
4. PPG Industries.
5. Pilkington North America, Inc.
6. Substitutions: Section 01 60 00 - Product Requirements.

2.2 FLOAT GLASS MATERIALS

A. Annealed Glass: ASTM C1036, Type 1 transparent flat, Quality Q3, float glass.
1. Furnish annealed glass except where heat strengthened or tempered glass is required to meet specified performance requirements.

B. Tempered Glass: ASTM C1048, Type 1 transparent flat, Quality Q3, Kind FT fully tempered, Condition an uncoated, float glass with horizontal tempering.
1. Furnish tempered glass conforming to CPSC 16 CFR 1201 Category II at locations where safety glass is required by applicable code.

2.3 FLOAT GLASS PRODUCTS

A. Clear Glass: Annealed and Tempered float glass as specified; Class 1 clear.
1. Clear annealed glass.
2. Clear tempered glass.
3. Minimum Thickness: 1/4 inch.
4. Visible Light Transmittance: 91percent minimum.
5. Solar Heat Gain Coefficient: .89 maximum.
6. Minimum Thickness: 1/4 inch.

B. Low E Glass: Annealed and Tempered float glass as specified; Class 1 clear.
1. Clear Low E annealed glass.
2. Clear Low E tempered glass.
3. Minimum Thickness: 1/4 inch.
4. Coating: ASTM C1376; pyrolytic.

2.4 INSULATING GLASS PRODUCTS

A. Insulating Glass: ASTM E2190; with glass elastomer glass to mastic silicone sealant edge seal; place reflective film within unit; purge interpane space with dry hermetic air.
1. Total Unit Thickness: 1 inch.
2. Insulating Glass Unit Edge Seal Construction: Aluminum, or Stainless steel, thermally broken, bent and soldered mitered and spigot corners.
3. Insulating Glass Unit Edge Seal Material: clear color.

B. Double Pane Insulating Vision Glass:
1. Outer Pane: Clear Low E annealed glass.
2. Inner Pane: Clear annealed glass.

3. U-Factor Winter Nighttime: .35 maximum.
4. U-Factor Summer: .35 maximum.
5. Solar Energy Transmittance: 52 percent minimum.
6. Visible Light Transmittance: 74 percent minimum.
7. Solar Heat Gain Coefficient: .62 maximum.
8.

C. GLAZING SEALANTS

D. Elastomeric Glazing Sealants: Materials compatible with adjacent materials including glass, insulating glass seals, and glazing channels.
1. Glazing Compounds: As recommended by manufacturer.

2.5 GLAZING ACCESSORIES

A. Setting Blocks: As recommended by manufacturer.

B. Spacer Shims: As recommended by manufacturer.

C. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution

B. Verify openings for glazing are correctly sized and within acceptable tolerance.

C. Verify surfaces of glazing channels or recesses are clean, free of obstructions impeding moisture movement; weeps are clear, and ready to receive glazing.

3.2 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.

3.3 INSTALLATION

A. Perform installation in accordance with GANA Glazing Manual.
1. Glazing Sealants: Comply with ASTM C119Interior Dry Method (Tape and Tape) Installation:
2. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
3. Place setting blocks at ¼ points with edge block no more than 6 inches from corners.
4. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
5. Place glazing tape on free perimeter of glazing in same manner described above.
6. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
7. Knife trim protruding tap.

3.4 CLEANING

A. Section 01 77 00 – Closeout Procedures: Final cleaning.

B. Remove glazing materials from finish surfaces.

C. Remove labels after Work is complete.

D. Clean glass and adjacent surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 73 00 - Execution: Protecting installed construction.

B. After installation, mark pane with an 'X' by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

END OF DIVISION

DIVISION 09 FINISHES

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Gypsum board and joint treatment
2. Tile backer board
3. Acoustic insulation
4. Textured finishes

B. Related Requirements:
1. Section 06 10 00 - Rough Carpentry: Building wood framing system
2. Section 06 10 53 - Miscellaneous Rough Carpentry: Wood support blocking
3. Section 06 10 53 - Miscellaneous Rough Carpentry: Product requirements for frames for washroom accessories for placement by this section
4. Section 07 21 16 - Blanket Insulation: Acoustic and Thermal insulation

1.2 REFERENCE STANDARDS

A. ASTM International:
1. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
2. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing
3. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
4. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board
5. ASTM C1002 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases
6. ASTM C1280 - Standard Specification for Application of Gypsum Sheathing
7. ASTM C1288 - Standard Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets
8. ASTM C1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cement Substrate Sheets
9. ASTM C1396/C1396M - Standard Specification for Gypsum Board
10. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
11. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
12. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials

B. Gypsum Association:
1. GA 214 - Recommended Levels of Gypsum Board Finish
2. GA 216 - Application and Finishing of Gypsum Board
3. GA 600 - Fire Resistance Design Manual Sound Control

C. Intertek Testing Services (Warnock Hersey Listed):
1. WH - Certification Listings

D. National Fire Protection Association:

1. NFPA 265 - Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls, Method B
2. NFPA 286 - Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Wall and Ceiling Interior Finish

E. Underwriters Laboratories Inc.:
1. UL - Fire Resistance Directory

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals

B. Product Data: Submit data on metal framing, gypsum board, joint tape; and acoustic accessories

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C840, GA-214, GA-216 and GA-600

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience

PART 2 - PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

A. Manufacturers:
1. CertainTeed Corporation.
2. Georgia-Pacific Gypsum LLC.
3. National Gypsum Company.
4. USG Corporation.
5. Substitutions: Section 01 60 00 - Product Requirements

B. Performance / Design Criteria:
1. Select stud thickness to resist minimum 5 psf uniform load and maximum 1/360 deflection.

2.2 COMPONENTS

A. Gypsum Board: ASTM C1396/C1396M; Type X fire resistant where indicated on Drawings
1. Standard Gypsum Board: Thickness as indicated on the drawings; maximum available length in place; ends square cut, tapered and beveled edges
2. Moisture Resistant Gypsum Board: Thickness as indicated on the drawings; maximum available length in place; ends square cut, tapered and beveled edges

B. Tile Backer Boards:
1. Fiber Mat Reinforced Cement Tile Backer Board: ASTM C1325; high density, glass fiber reinforced; 1/2 inch thick; mold resistant
2. Tile Backer Board Joint Tape: 2 inch wide, coated glass fiber tape for joints and corners

2.3 ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced, Thickness as indicated on the drawings

B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board

C. Gypsum Board Accessories: ASTM C1047; metal plastic, metal and paper combination; corner beads, edge trim, and expansion joints
   1. Metal Accessories: Galvanized steel
   2. Plastic Accessories: PVC plastic or ABS plastic
   3. Edge Trim: Type LC, L, and U bead

D. Joint Materials: ASTM C475/C475M; reinforcing tape, joint compound, and water

E. Textured Finish Materials: Latex based texturing material

F. Gypsum Board Screws: ASTM C954; length to suit application
   1. Screws for Steel Framing: Type S
   2. Screws for Wood Framing: Type W

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution: Requirements for installation examination

B. Verify site conditions are ready to receive work and opening dimensions are as indicated on drawings

3.2 INSTALLATION

A. Wall Furring Installation:
   1. Erect wall furring for direct attachment to concrete masonry walls
   2. Erect furring channels vertically; space maximum 24 inches oc, not more than 4 inches from abutting walls
      a. Secure in place on alternate channel flanges at maximum 24 inches on center
   3. Install thermal insulation between Z-furring channels directly attached to concrete masonry walls

B. Acoustic Accessories Installation:
   1. Install resilient channels at maximum 24 inches on center
      a. Locate joints over framing members
   2. Place acoustic insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions
   3. Install acoustic sealant at gypsum board perimeter at:
      a. Metal Framing: One beads
      b. Seal penetrations of partitions by conduit, pipe, duct work, and rough-in boxes

C. Gypsum Board Installation:
   1. Install gypsum board in accordance with GA-216. Install moisture resistant gypsum board on walls and ceilings where plumbing fixtures, water heaters, or equipment plumbed with water is present.
   2. Erect single layer board in most economical direction, with ends and edges occurring over firm bearing
   3. Erect single layer fire rated gypsum board in most economical direction, with edges and ends occurring over firm bearing
   4. Use screws when fastening gypsum board to metal furring or framing
   5. Use screws when fastening gypsum board to wood furring or framing
   6. Place corner beads at external corners Use longest practical length
   7. Place edge trim where gypsum board abuts dissimilar materials
   8. Install cementitious backing board over metal studs

D. Joint Treatment:

1. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes
2. Feather coats on to adjoining surfaces so that camber is maximum 1/32 inch
3. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile
4. Fill and finish joints and corners of cementitious backing board

E. Texture Finish: Spray, or Roller, apply finish texture coating

3.3 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances

B. Maximum Variation of Finished Gypsum Board Surface from Flat Surface: 1/8 inch in 10 feet

END OF SECTION

SECTION 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes metal stud framing and accessories at interior locations

B. Related Sections:
   1. Section 06 10 53 - Miscellaneous Rough Carpentry: Rough wood blocking within stud framing
   2. Section 07 21 16 - Blanket Insulation: Insulation between framing members

1.2 REFERENCES

A. ASTM International:
   1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
   2. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members
   3. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
   4. ASTM C1002 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases

B. National Association of Architectural Metal Manufacturers:
   1. NAAMM ML/SFA 540 - Lightweight Steel Framing Systems Manual

1.3 SYSTEM DESCRIPTION

A. Interior Walls: Metal stud framing system with batt type acoustic insulation specified in Section 09 21 16, interior gypsum board specified in Section 09 21 16

B. Maximum Allowable Deflection: 1:600 span

C. Wall System:
   1. Design to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges
   2. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings

1.4 PERFORMANCE REQUIREMENTS

A. Select stud thickness to resist minimum 5 psf uniform load and maximum 1/360 deflection

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Product Data: Submit data describing standard framing member materials and finish, product criteria, load charts, and limitations

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C754 or NAAMM ML/SFA 540

B. Form, fabricate, install, and connect components in accordance with NAAMM ML/SFA 540

C. Furnish framing materials in accordance with SSMA - Product Technical Information

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience
   1. Framing Manufacturer: Current member of Steel Stud Manufacturers Association

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience

1.8 COORDINATION

A. Section 01 31 00 – Project Management and Coordination

B. Coordinate placement of components within stud framing system specified in Sections

PART 2 - PRODUCTS

2.1 METAL FRAMING SYSTEM

A. Manufacturers:
   1. Clark Steel Framing Systems
   2. Dietrich Industries, Inc.
   3. Harrison Manufacturing Co.
   4. Marino/Ware
   5. Unimast Incorporated
   6. Substitutions: Section 01 60 00 - Product Requirements

2.2 COMPONENTS

A. Studs: ASTM A653/A653M, non-load bearing rolled steel, channel shaped, punched for utility access, as follows:
   1. Depth: As shown on the drawings
   2. Thickness:
      a. Interior Walls: 25 gauge with 22 gauge at jambs of all openings.

B. Tracks and Headers: Same material and thickness as studs, bent leg retainer notched to receive studs
   1. Ceiling Runners: With extended leg retainer

C. Furring and Bracing Members: Of same material as studs; thickness to suit purpose

D. Fasteners: ASTM C1002; Type S; length to suit application

E. Sheet Metal Backing: 20 gauge galvanized steel for reinforcement of

F. Anchorage Devices: Power actuated

G. Shaft Wall Studs: 20 gauge CT studs and J-tabbed track, 4” overall depth, designed for use with 1” thick gypsum panels.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution

B. Verify rough-in utilities are in proper location

3.2 INSTALLATION

A. Align and secure top and bottom runners at 24 inches oc

B. Place one beads of acoustic sealant between runners and substrate, studs and adjacent construction to achieve acoustic seal

C. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs

D. Install studs vertically at 16 inches oc

E. Align stud web openings horizontally

F. Secure studs to tracks using fastener method
   1. Do not weld

G. Stud splicing not permissible

H. Fabricate corners using minimum of three studs

I. Double stud at wall openings, door and window jambs, not more than 2 inches from each side of openings

J. Brace stud framing system rigid

K. Coordinate erection of studs with requirements of door frames and window frames; install supports and attachments

L. Coordinate installation of wood bucks, anchors, and wood blocking with electrical and mechanical work to be placed within or behind stud framing

M. Backing: Install backing for support of plumbing fixtures, wall cabinets, toilet accessories, hardware, and opening frames
   1. Secure 20 gauge fat strapping width as required with minimum of 6″ width

N. Extend stud framing to ceiling only. Attach ceiling runner securely to ceiling framing in accordance with details indicated

O. Coordinate placement of insulation in stud spaces after stud frame erection

3.3 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances

B. Maximum Variation From Indicated Position: 1/8 inch in 10 feet

C. Maximum Variation From Plumb: 1/8 inch in 10 feet

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Resilient sheet flooring
   2. Resilient tile flooring
   3. Resilient base

1.2 REFERENCES

A. ASTM International:
   1. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile
   2. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing
   3. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile
   4. ASTM F1861 - Standard Specification for Resilient Wall Base

B. Federal Specification Unit:
   1. FS L-F-475 - Floor Covering Vinyl, Surface (Tile and Roll), with Backing
   2. FS RR-T-650 - Treads, Metallic and Nonmetallic, Skid Resistant

C. National Fire Protection Association:
   1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Shop Drawings: Indicate seaming plan, custom patterns and inlay designs

C. Product Data: Submit data describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions

D. Samples:
   1. Submit manufacturer's complete set of color samples for initial selection
   2. Submit two samples illustrating color and pattern for each resilient flooring product specified

1.4 CLOSEOUT SUBMITTALS

A. Section 01 77 00 – Closeout Procedures: Closeout Submittals

B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements

B. Protect roll materials from damage by storing on end

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements

B. Maintain temperature in storage area between 55 degrees F and 90 degrees F

C. Store materials for not less than 48 hours prior to installation in area of installation at temperature of 70 degrees F to achieve temperature stability
   1. Thereafter, maintain conditions above 55 degrees F

1.8 EXTRA MATERIALS

A. Section 01 78 23 – Operation and Maintenance Data

B. Furnish:
   1. Flooring: 25 sq ft of each type and color specified
   2. Base: 25 lineal feet of each type and color specified

PART 2 - PRODUCTS

2.1 TILE FLOORING

A. Manufacturers:
   1. Shaw Industries Group, Inc.
   2. Mannington Mills, Inc
   3. Johnsonite
   4. Armstrong World Industries
   5. Substitutions: Not permitted

B. Products, colors and patterns as indicated in Drawings.

2.2 RESILIENT BASE

A. Manufacturers:
   1. Johnsonite
   2. Substitutions: Section 01 60 00 - Product Requirements

B. Products:
   1. Color and profile as indicated in Drawings.

2.3 ACCESSORIES

A. Subfloor Filler: Type recommended by adhesive material manufacturer

B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer

C. Moldings and Edge Strips: Rubber or Vinyl.

D. Filler for Coved Base: Plastic

E. Sealer and Wax: Types recommended by flooring manufacturer

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution

B. Verify concrete floors are dry to maximum moisture content as recommended by manufacturer, and exhibit negative alkalinity, carbonization, and dusting

C. Verify floor and lower wall surfaces are free of substances capable of impairing adhesion of new adhesive and finish materials

3.2 PREPARATION

A. Remove sub-floor ridges and bumps

B. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface

C. Prohibit traffic until filler is cured

D. Clean substrate

E. Apply primer as required to prevent "bleed-thru" or interference with adhesion by substances that cannot be removed.

3.3 INSTALLATION - SHEET FLOORING

A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams
   1. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams

B. Double cut sheet; provide chemically bonded seams.

C. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door

D. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated
   1. Secure resilient strips by adhesive

E. Install coved base as detailed on drawings, using coved base filler as backing at floor to wall junction
   1. Extend sheet flooring vertically to height indicated , and cover top edge with metal cap strip

F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints

3.4 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern

C. Install tile to monolith pattern
   1. Allow minimum 1/2 full size tile width at room or area perimeter

D. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints

E. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door

F. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated

3.5 INSTALLATION - BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints

B. Miter internal corners. At external corners, use pre-molded units. At exposed ends, use pre-molded units

C. Install base on solid backing
   1. Bond tightly to wall and floor surfaces

D. Scribe and fit to door frames and other interruptions

3.6 CLEANING

A. Section 01 77 00 - Closeout Procedures: Final cleaning

B. Remove excess adhesive from floor, base, and wall surfaces without damage

C. Clean, seal, and maintain resilient flooring products

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 73 00 - Execution: Protecting installed construction

B. Prohibit traffic on resilient flooring for 48 hours after installation

3.8 SCHEDULE

A. Refer to Room Finish Schedule and Floor Finishes Plan

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and field application of paints, stains, varnishes, and other coatings

B. Related Sections:
   1. Section 05 50 00 - Metal Fabrications: Shop primed items
   2. Section 09 21 16 - Gypsum Board Assemblies: Texturing Gypsum Board Walls

1.2 REFERENCES

A. ASTM International:
   1. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications
   2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials
   3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

B. Green Seal:
   1. GS-03 – Anti-Corrosive Paints.
   2. GS-11 – Paints and Coatings.

C. Painting and Decorating Contractors of America:
   1. PDCA - Architectural Painting Specification Manual

D. SSPC: The Society for Protective Coatings:
   1. SSPC - Steel Structures Painting Manual

1.3 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Product Data: Submit data on finishing products and special coating

C. Samples:
   1. Submit paper chip samples illustrating range of colors and textures available for each surface finishing product scheduled

1.5 CLOSEOUT SUBMITTALS

A. Section 01 77 00 – Closeout Procedures: Closeout Submittals

B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces

C. Provide a minimum of one gallon of each paint color and finish for owners attic stock.

1.6 QUALITY ASSURANCE

A. Surface Burning Characteristics:
   1. Fire Retardant Finishes: Maximum 25/450 flame spread/smoke developed index

when tested in accordance with ASTM E84

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years documented experience

B. Applicator: Company specializing in performing work of this section with minimum five years documented experience

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability

C. Container Label Include:
   1. Manufacturer's Name
   2. Type of Paint
   3. Brand Name
   4. Lot Number
   5. Brand Code
   6. Coverage
   7. Surface Preparation
   8. Drying Time
   9. Cleanup Requirements
   10. Color Designation
   11. Instructions for Mixing and Reducing

D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions

1.9 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer

C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer

D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions

E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions

F. Provide lighting level of 80 ft candle measured mid-height at substrate surface

1.10 SEQUENCING

A. Sequence application to the following:
   1. Do not apply finish coats until paintable sealant is applied
   2. Back prime wood trim before installation of trim

1.11 WARRANTY

A. Section 01 77 00 – Closeout Procedures: Warranties

B. Furnish five year manufacturer warranty for paints and coatings

1.12 EXTRA MATERIALS

A. Section 01 78 23 – Operation and Maintenance Data

PART 2 - PRODUCTS

2.1 PAINTS AND COATINGS

A. Manufacturers:
   1. Benjamin Moore & Co
   2. Columbia Paint & Coatings
   3. Devoe Paint Company
   4. Kwal Paint
   5. PPG Architectural Finishes, Inc
   6. Sherwin Williams Paint Co
   7. Substitutions: Not Permitted

2.2 COMPONENTS

A. Coatings: Ready mixed, except field catalyzed coatings
   1. Prepare coatings:
      a. To soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating
      b. For good flow and brushing properties
      c. Capable of drying or curing free of streaks or sags

B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality

C. Patching Materials: Latex filler

D. Fastener Head Cover Materials: Latex filler

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution

B. Verify surfaces and substrate conditions are ready to receive Work as instructed by product manufacturer

C. Examine surfaces scheduled to be finished prior to commencement of work
   1. Report conditions capable of affecting proper application

D. Test shop applied primer for compatibility with subsequent cover materials

E. Measure moisture content of surfaces using electronic moisture meter
   1. Do not apply finishes unless moisture content of surfaces are below the following maximums:
      a. Plaster and Gypsum Wallboard: 12 percent
      b. Masonry, Concrete, and Concrete Unit Masonry: 12 percent
      c. Interior Wood: 15 percent, measured in accordance with ASTM D4442
      d. Concrete Floors: 8 percent

3.2 PREPARATION

A. Aluminum Surfaces Scheduled for Paint Finish:
   1. Remove surface contamination by steam or high pressure water
   2. Remove oxidation with acid etch and solvent washing
   3. Apply etching primer immediately following cleaning

B. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish:
   1. Remove foreign particles to permit adhesion of finishing materials
   2. Apply compatible sealer or primer

C. Insulated Coverings:
   1. Remove dirt, grease, and oil from canvas and cotton

D. Concrete Floors:
   1. Remove contamination, acid etch, and rinse floors with clear water
   2. Verify required acid-alkali balance is achieved
   3. Allow to dry.

E. Copper Surfaces Scheduled for Paint Finish:
   1. Remove contamination by steam, high pressure water, or solvent washing
   2. Apply vinyl etch primer immediately following cleaning.

F. Copper Surfaces Scheduled for Natural Oxidized Finish:
   1. Remove contamination by applying oxidizing solution of copper acetate and ammonium chloride in acetic acid
   2. Rub on repeatedly for required effect
   3. Once attained, rinse surfaces with clear water and allow to dry

G. Gypsum Board Surfaces:
   1. Fill minor defects with filler compound
   2. Spot prime defects after repair

H. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent
   2. Apply coat of etching primer

I. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish:
   1. Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter
   2. Remove oil and grease with solution of tri-sodium phosphate
      a. Rinse well and allow to dry
   3. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water
      a. Allow to dry.

J. Plaster Surfaces:
   1. Fill hairline cracks, small holes, and imperfections with latex patching plaster
   2. Make smooth and flush with adjacent surfaces
   3. Wash and neutralize high alkali surfaces

K. Uncoated Steel and Iron Surfaces:
   1. Remove grease, mill scale, weld splatter, dirt, and rust
   2. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent
   3. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned
   4. Spot prime paint after repairs

L. Shop Primed Steel Surfaces:
   1. Sand and scrape to remove loose primer and rust
   2. Feather edges to make touch-up patches inconspicuous
   3. Clean surfaces with solvent
   4. Prime bare steel surfaces

M. Interior Wood Items Scheduled to Receive Paint Finish:
   1. Wipe off dust and grit prior to priming
   2. Seal knots, pitch streaks, and sappy sections with sealer
   3. Fill nail holes and cracks after primer has dried; sand between coats

N. Interior Wood Items Scheduled to Receive Transparent Finish:
   1. Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer
   2. Fill nail holes and cracks after sealer has dried; sand lightly between coats

O. Wood Doors Scheduled for Painting:
   1. Seal wood door top and bottom edge surfaces with clear sealer

P. Metal Doors Scheduled for Painting: Prime metal door top and bottom edge surfaces

Q. Exterior Wood
   1. Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer
   2. Fill nail holes and cracks after sealer has dried; sand lightly between coats

3.3 APPLICATION

A. Do not apply finishes to surfaces that are not dry
   1. Allow applied coats to dry before next coat is applied

B. Apply each coat to uniform appearance
   1. Apply each coat of paint slightly darker than preceding coat unless specified otherwise

C. Sand wood and metal surfaces lightly between coats to achieve required finish

D. Vacuum clean surfaces of loose particles
   1. Use tack cloth to remove dust and particles just prior to applying next coat

E. Where clear finishes are required, tint fillers to match wood
   1. Work fillers into grain before set
   2. Wipe excess from surface.

F. Prime concealed surfaces of interior and exterior woodwork with primer paint

G. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner

H. Finishing Mechanical And Electrical Equipment:
   1. Paint shop primed equipment
   2. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately
   3. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports except where items are shop finished
   4. Paint interior surfaces of air ducts and convector and baseboard heating cabinets visible through grilles and louvers with one coat of flat black paint to visible surfaces
   5. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels
   6. Paint exposed conduit and electrical equipment occurring in finished areas
   7. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment
   8. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing

3.5 CLEANING

A. Section 01 77 00 - Closeout Procedures: Final cleaning

B. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site

3.6 SCHEDULE - SHOP PRIMED ITEMS FOR SITE FINISHING

A. Metal Fabrications (Section 05 50 00).

3.7 SCHEDULE - EXTERIOR SURFACES

A. Pavement Markings:
   1. Two coats of solvent based acrylic copolymer paint, yellow

B. Exposed Concrete Masonry Units (Base Bid)
   1. Two coats of 100% clear waterproof sealer

C. Exposed Concrete Masonry Units (Add Alternate)
   1. One coat of block filler
   2. Two coats of latex semi-gloss

D. Steel - Unprimed:
   1. One coat of alkyd primer
   2. Two coats of alkyd enamel, gloss or semi-gloss

E. Steel - Shop Primed:
   1. Touch-up with zinc chromate primer.
   2. Two coats of alkyd enamel, gloss or semi-gloss

F. Steel - Galvanized:
   1. One coat galvanize primer
   2. Two coats of alkyd enamel, gloss or semi-gloss

G. Aluminum - Mill Finish:
   1. One coat etching primer
   2. Two coats of alkyd enamel, gloss or semi-gloss

H. Wood - Transparent:
   1. Filler coat (for open grained wood only)
   2. One coat of stain
   3. Two coats of varnish, gloss

3.8 SCHEDULE - INTERIOR SURFACES

A. Wood - Painted:
   1. One coat of alkyd prime sealer
   2. Two coats of pre-catalyzed water-based epoxy, gloss or semi-gloss

B. Wood - Transparent:
   1. Filler coat (for open grained wood only)
   2. One coat of stain
   3. Two coats of varnish, gloss

C. Concrete, Concrete Masonry Units Painted:
   1. One coat of block filler
   2. Two coats of latex, semi-gloss

D. Concrete Masonry Units (Not Painted),
   1. Two coats of 100% clear waterproof sealer

E. Steel - Unprimed:
   1. One coat of latex primer
   2. Two coats of pre-catalyzed water-based epoxy, gloss or semi-gloss

F. Steel - Primed:
   1. Touch-up with latex primer.

2. Two coats of pre-catalyzed water-based epoxy, gloss or semi-gloss

G. Steel - Galvanized:
   1. One coat galvanize primer
   2. Two coats of pre-catalyzed water-based epoxy, gloss or semi-gloss

H. Aluminum - Mill Finish:
   1. One coat etching primer
   2. Two coats of pre-catalyzed water-based epoxy, gloss or semi-gloss

I. Gypsum Board Walls and Ceilings:
   1. One coat of latex primer sealer
   2. Two coats latex acrylic enamel, egg shell

END OF DIVISION

DIVISION 10 SPECIALTIES

SECTION 10 14 00

SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes exterior signs.

1.2 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign.

C. Samples: Submit two signs, large enough in size illustrating type, style, letter font, and colors specified; method of attachment.

D. Manufacturer's Installation Instructions: Submit installation template and attachment devices.

1.3 QUALITIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Package signs, labeled in name groups.

C. Store adhesive attachment tape at ambient room temperatures.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

D. Do not install signs when ambient temperature is lower than recommended by manufacturer.

E. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 EXTERIOR SIGNAGE

A. Reverse Channel/Fabricated letters: Fabricate letters to comply with requirements indicated below and as indicated on drawings.
   1. Manufacturers:
      a. Gemini Incorporated
      b. Impact Signs
      c. Substitutions: Section 01 60 00 Product Requirements
   2. Form letters by heliarc welding process or soldering process depending on material chosen. Produce characters with smooth flat faces, sharp corners,

precisely formed lines and profiles, free from pits, scale, sand holes and other defects. Apply anchoring devices into individual letters as required for anchorage.

3. Characteristics:
   a. Metal: Painted Aluminum
   b. Size: As indicated on the drawings
   c. Thickness 1-1/2 inch
   d. Letter style: As indicated on drawings
   e. Finish: Selected from manufactures full range of finishes
   f. Faces: metal
   g. Text: As indicated on the drawings.
   h. Backs: removable clear Lexan.
   i. Mounting: detachable stud with removable can mount.
   j. Lit fabricated with LEDs: back (halo) lit.

B. Template: Provide full size paper mounting template showing hole placement and location of mounting holes.

C. Finishes: Colors and surface textures for exposed letters as selected by the architect from the manufacturer's standards.

2.2 INTERIOR SIGNS

A. Engraved Signs: Laminated colored plastic; lettering engraved through face to expose core color:

1. Face Color: As indicated on drawings.
2. Core Color: As indicated on drawings
1. Total Thickness: 1/8 inch.
2. Sign Height: As indicated on drawings.
3. Edges: As indicated on drawings
4. Character Font: As indicated on drawings.
5. Character Case: Upper case.
6. Text Height. As indicated on drawings
7. Provide Braille on each sign

B. Graphic Style: Handicapped type.

C. See details on drawings for sign types.

2.3 ACCESSORIES

A. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

3.2 INSTALLATION

A. Install signs after door surfaces are finished, in locations indicated on Drawings.

B. See mounting elevations on Drawing Sheet A500.

3.3 SCHEDULES

A. Provide signs for each room called out on plans.

B. Service Room Signs: Plaque signs, face color as indicated on drawings, "UTILITY ROOM", SERVICE ROOM", and "ELECTRICAL ROOM"; at each respective room location.

END OF SECTION

SECTION 10 21 13

TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Solid plastic toilet compartments including the following: (Evolve)
   1. Floor mounted overhead-braced toilet compartments.
   2. Urinal screens: floor anchored

1.2 RELATED SECTIONS

A. Section 06 10 53 - Miscellaneous Rough Carpentry

B. Section 09 21 16 - Gypsum Board Assemblies

C. Section 09 22 16 - Non-Structural Metal Framing

1.3 REFERENCES

A. ASTM B 85 - Standard Specification for Aluminum-Alloy Die Castings.

B. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

C. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. National Fire Protection Association (NFPA) 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Provide layout drawings and installation details with location and type of hardware required.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.

B. Installer Qualifications: A company regularly engaged in installation of products specified in this Section, with a minimum of 5 years experience.

C. Performance Requirements:
   1. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with the ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials:
      a. Class B flame spread/smoke developed rating, tested to ASTM E84.
   2. Material Fire Ratings:
      b. National Fire Protection Association (NFPA) 286: Pass.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Manufacturer guarantees its plastic against breakage, corrosion, and delamination under normal conditions for 10 years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. (Labor not included in warranty.)

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Bobrick

B. Bradley Corp.

C. ASI Group

D. Metpar Corp.

E. Substitutions: Section 01 60 00 - Product Requirements.

2.2 TOILET COMPARTMENTS WITH ALUMINUM FRAME AND PEDESTAL SUPPORT (EVOLVE SYSTEM)

A. Substrate Material:
   1. Compact Grade Laminate (Phelolic Black Core)
      a. Materials: Solidly fused plastic laminate with matte-finish melamine surfaces; integrally bonded colored face sheets and black phelolic-resin core.
      b. Edges: Black; brown edges not acceptable
      c. Color:
         1) As selected by Architect from manufacturer's standard range.
      d. Dividing Panel Size: Panel up to 72-inches deep to be one-piece panels.
   2. Toilet Compartments:
      a. Configuration: Floor-anchored, overhead-braced toilet cubicles.
      b. Basis of Design: Bobrick Evolve Toilet Cubicles.
         1) Door Hardware and Pedestal: clear anodized aluminum
         2) Height: overall height from finished floor to top of headrail is 81-inches

consisting of 9-inch floor clearance, 71-inch doors, and 1-inch headrail.

3. Fire Resistance:
   a. Class C
      1) Flame Spread Index (ADTM E84): Between 26 and 75 for panels, doors, and fascia panels.
      2) Smoke Developed Index (ASTM 84): No more than 450 for panels, doors and fascia panels.
      3) National Fire Protection Association/International Building Code Interior Wall and Ceiling Finish: Class C
      4) Uniform Building Code: Class 2
4. Urinal Privacy Screen:
   a. Basis of Design: Bobrick Evolve Urinal Privacy Screens
   b. Configuration: Floor anchored
   c. Screen Size:
      1) Max Height: 72-inch
      2) Max Width: 24-inch
   d. Hardware: 9-inch pedestal, urinal screen hardware to match cubicle hardware.
5. Finished Thickness: ½-inch for fascia panels, doors, and panels
6. Frame:
   a. Headrail: secured to the top of the fascia for stability
   b. Mounting Brackets and Fasteners: Clear anodized aluminum U-Channel brackets.
   c. Privacy:
      1) Full-length clear anodized aluminum frame provides built-in, no sightline privacy on hinge and keeping-sides of the door.
      2) Continuous clear anodized aluminum U-Channels fasten divider and fascia panels to the wall.
7. Hardware:
   a. Compliance
      1) Door handle is operable with one hand, without tight grasping, pinching, or twisting of the wrist, and force to operate does not exceed 5 pounds.
      2) Floor clearance: 9-inch high minimum clearance maintained under fascia panel and side divider panels.
      3) Keyed emergency access: latch allows door to be opened from the outside of the compartment with keyed emergency release slot in the indicator
      4) Fastening: Hardware secured to door and fascia by stainless steel sheet metal screws.
      5) Door closing: Clear anodized aluminum pedestal secured beneath door incorporates a spring closing mechanism, creating a soft door close and includes (+/-) 1-inch adjustment.
      6) Door hardware type:
         a) Locking: clear anodized aluminum door handle locates directly into the vertical keeping extrusion. Integral rubber door bumper cushions doors when closing.
         b) Occupancy indicator: Clear anodized aluminum circular escutcheon with red and white indicator.
         c) Pedestal: Cylindrical pedestal supports divider panels and maintains a 9-inch high floor clearance under fascia panel and side divider panels and includes (+/-) 1-inch adjustment.
         d) Robe hook: Clear anodized aluminum in matte finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Examine areas to receive toilet partitions, screens, and shower compartments for correct height and spacing of anchorage/blocking and plumbing fixtures that affect installation of partitions. Report discrepancies to the architect.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved Shop Drawings.

B. Install partitions rigid, straight, plumb, and level.

C. Locate bottom edge of doors and panels 9 inches above finished floor.

D. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/8 inch (9.5 mm).

E. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.

F. Finished surfaces shall be cleaned after installation and be left free of imperfections.

3.4 ADJUSTING

A. Adjust doors and latches to operate correctly.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes toilet accessories and utility room accessories

B. Related Sections:
   1. Section 06 10 53 – Miscellaneous Rough Carpentry
   2. Section 10 21 13 - Toilet Compartments

1.2 REFERENCES

A. ASTM International:
   1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
   2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
   3. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
   4. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
   5. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
   6. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
   7. ASTM C1036 - Standard Specification for Flat Glass

B. Federal Specification Unit:
   1. FS A-A-3002 - Mirrors, Glass

1.3 DESIGN REQUIREMENTS

A. Design grab bars and attachments to resist minimum 250 lb concentrated load applied at any point in any direction and forces as required by applicable code

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures

B. Product Data: Submit data on accessories describing size, finish, details of function, attachment methods

1.5 COORDINATION

A. Section 01 31 00 – Project Management and Coordination: Coordination and project conditions

B. Coordinate the Work with placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments

PART 2 - PRODUCTS

2.1 TOILET AND BATH ACCESSORIES

A. Manufacturers:
   1. A&J Washroom Accessories, Inc

2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. Substitutions: Section 01 60 00 - Product Requirements

2.2 COMPONENTS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation
   1. Grind welded joints smooth
   2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces

B. Keys: Furnish two keys for each accessory to Owner

C. Stainless Steel Sheet: ASTM A666 Type 304

D. Stainless Steel Tubing: ASTM A269, Type 304 stainless steel

E. Galvanized Sheet Steel: ASTM A653/A653M, G90 zinc coating

F. Mirror Glass (Type MR-F): ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality Q1 mirror select; type with copper and silver coating, and organic over-coating

G. Adhesive: Two component epoxy type, waterproof

H. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof

I. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate

2.3 TOILET ROOM ACCESSORIES

A. Toilet Paper Dispenser: Roll-in-reserve type, designed to allow automatic activation of reserve roll when needed, or manual activation by pressing release bar, surface-mounted, Satin-finish stainless steel with stainless steel dispensing mechanism, tumbler lock
   1. Product: 9030 manufactured by American Specialties, Inc
   2. Product: B-2888 manufactured by Bobrick
   3. Product: 5402 manufactured by Bradley

B. Paper Towel Dispenser: Folded paper type, stainless steel, surface-mounted, with viewing slots on sides as refill indicator and tumbler lock
   1. Capacity: 300 C-fold minimum
   2. Product: 20210 manufactured by American Specialties, Inc
   3. Product: B-262 manufactured by Bobrick
   4. Product: 250-15 manufactured by Bradley

D. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, for with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gage refill indicator
   1. Minimum Capacity: 40 ounces
   2. Product: 9343 manufactured by American Specialties, Inc
   3. Product: B-2112 manufactured by Bobrick
   4. Product: 6542 manufactured by Bradley

E. Mirrors: frameless ¼” polished plate glass
   1. Size: As indicated on Drawings
   2. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and non-absorptive filler material
   3. Product: 0625 manufactured by American Specialties, Inc
   4. Product: B-166 1824 manufactured by Bobrick

5. Product: 7815 manufactured by Bradley

F. Grab Bars: Stainless steel, 18 Gauge 1-1/4 inches outside diameter, minimum 18 gauge wall Thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar
   1. Length and configuration: As indicated on Drawings

2.4 SHOWER AND TUB ACCESSORIES

A. Shower Curtain Rod: Stainless steel tube, 1-1/4 inch outside diameter, 22 gauge, satin-finished, with 3 inch outside diameter, minimum 0.04 inch thick satin-finished stainless steel flanges, for installation with concealed mounting.

B. Shower Curtain: Opaque vinyl, 6 gauge thick, matte finish, with antibacterial treatment, flame resistant and stain-resistant fabric.

C. Folding Shower Seat: Wall-mounted surface; welded tubular seat frame, structural support members, hinges and mechanical fasteners of Type 304 stainless steel, L-shaped, right-hand or left-hand seat.
   1. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of color as selected.
   2. Seat: Teakwood slats secured to supporting frame members with stainless steel screws. Ease edges of each slat.

D. Wall-Mounted Soap Dish: Normal duty, seamless stainless steel, surface-mounted with drain holes, without grab bar, satin finish; with concealed mechanical fastening suitable for substrate and backplate.
   1. Product: 0720-Z manufactured by American Specialties, Inc.
   2. Product: B-680 manufactured by Bobrick.
   3. Product: 9014 manufactured by Bradley.

2.5 UTILITY ROOM ACCESSORIES

A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets
   1. Drying rod: Stainless steel, 1/4 inch diameter
   2. Hooks: 3, 0.06 inch stainless steel rag hooks at shelf front
   3. Mop/broom holders: spring-loaded rubber cam holders at shelf front
   4. Length: As indicated on Drawings
   5. Product: 1315 series manufactured by American Specialties, Inc
   6. Product: B-223 series manufactured by Bobrick
   7. Product: 998 series manufactured by Bradley

2.6 FACTORY FINISHING

A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted

B. Chrome/Nickel Plating: ASTM B456, Type SC 2, satin finish , unless otherwise noted

C. Baked Enamel: Pre-treat to clean condition, apply one coat primer and minimum two coats electrostatic baked enamel

D. Galvanizing ASTM A123/A123M; hot dip galvanize after fabrication

E. Galvanizing for Nuts, Bolts and Washers: ASTM A153/A153M

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution

B. Verify exact location of accessories for installation

C. Verify field measurements are as indicated on product data

3.2 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation

B. Provide templates and rough-in measurements as required

3.3 INSTALLATION

A. Install plumb and level, securely and rigidly anchored to substrate

B. Mounting Heights and Locations: As indicated on Drawings or required by accessibility regulations

END OF SECTION

SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes fire extinguishers and fire extinguisher cabinets.

B. Related Sections:
1. Section 06 10 53 - Miscellaneous Rough Carpentry: Wood blocking and shims.
2. Section 06 10 00 – Rough Carpentry: Roughed-in wall openings; Execution requirements for placement of rough-in frame for cabinets.

1.2 REFERENCES

A. National Fire Protection Association:
1. NFPA 10 - Standard for Portable Fire Extinguishers.

B. Underwriters Laboratories Inc.:
1. UL - Fire Protection Equipment Directory.

1.3 PERFORMANCE REQUIREMENTS

A. Conform to NFPA 10 applicable code.

B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.

C. Provide fire extinguisher cabinets classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements, location, and fire ratings, .

C. Product Data: Submit extinguisher operational features, color and finish, and anchorage details.

D. Manufacturer's Installation Instructions: Submit special criteria and wall opening coordination requirements.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 77 00 – Closeout Procedures: Closeout submittals.

B. Operation and Maintenance Data: Submit test, refill or recharge schedules and re-certification requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Do not install extinguishers when ambient temperature are capable of freezing extinguisher ingredients.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS

A. Dry Chemical Type: Cast steel tank, with pressure gage; Class A, B, C, Size 10.

B. Extinguisher Finish: Steel, enamel to red color.

2.2 ACCESSORIES

A. Extinguisher Brackets: galvanized finish.

B. Fire extinguisher wall hanger.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution

3.2 INSTALLATION

A. Install wall brackets, maximum 48 inches from finished floor to top of extinguisher handle.

B. Secure rigidly in place.

C. Place extinguishers in cabinets.

3.3 SCHEDULES

A. Fire Extinguisher location shown on the Drawings.

END OF DIVISION

DIVISION 13 SPECIAL CONSTRUCTION

SECTION 13 34 19

METAL BUILDING SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes pre-engineered, shop fabricated structural steel building frame; metal wall and single sloped roof system including trimmed openings, forming weather tight, durable, and easily erected metal building system.

B. Related Sections:
   1. Section 03 10 00 - Concrete Forming and Accessories: Execution requirements for placement of anchor bolts specified in this section in concrete.
   2. Section 07 90 00 - Joint Protection.
   3. Section 09 90 00 - Painting and Coating

1.2 REFERENCES

A. American Institute of Steel Construction:
   1. AISC S335 - Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.
   2. AISC S342L - Load and Resistance Factor Design Specification for Structural Steel Buildings.

B. ASTM International:
   1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
   2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   4. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
   5. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
   6. ASTM A490 - Standard Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength.
   7. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
   8. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
   9. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
   10. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
   11. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   12. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
   13. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

C. American Welding Society:
   1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

2. AWS D1.1 - Structural Welding Code - Steel.

D. Metal Building Manufacturers Association:
   1. MBMA - Low Rise Building Systems Manual.

E. SSPC: The Society for Protective Coatings:
   1. SSPC - Steel Structures Painting Manual.
   2. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

F. Underwriters Laboratories Inc.:
   1. UL - Building Materials Directory.

1.3 SYSTEM DESCRIPTION

A. Single span rigid frame.

B. Bay Spacing: 26 ft.

C. Primary Framing: Rigid frame of rafter beams and columns, expendable end walls (full end wall frames) and wind bracing.

D. Secondary Framing: purlins, girts, eave struts, flange bracing, clips, and other items detailed.

E. Wall System: Preformed metal panels of vertical and horizontal profile as indicated on drawings, with sub-girt framing/anchorage assembly, and accessory components.

F. Roof System : Preformed metal panels of upslope profile, with sub-girt framing/anchorage assembly, and accessory components.

G. Roof Slope: As indicated on Drawings.

1.4 DESIGN REQUIREMENTS

A. Design members to withstand dead load, applicable snow load, vertical and horizontal seismic loads, and design loads due to pressure and suction of wind calculated in accordance with applicable code.

B. Design members to support mechanical and electrical equipment.

C. Maximum allowable deflection: 1/180 of span with imposed loads for exterior wall and roof system.

D. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.

E. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 180 degrees F.

F. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

1.5 PERFORMANCE REQUIREMENTS

A. Conform to applicable code for submission of design calculations, reviewed shop and erection drawings, and as required for acquiring permits.

B. Cooperate with regulatory agency or authority and provide data as requested authority having jurisdiction.

C. Provide components of each type from one manufacturer compatible with adjacent materials.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections, attachments, openings, cambers, loads,; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, method or installation; framing anchor bolt settings, sizes, and locations from datum, and foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.

C. Product Data: Submit data on profiles, component dimensions, fasteners and performance characteristics.

D. Samples: Submit two samples of pre-coated metal panels for each color selected, 12” by full panel width in size illustrating color and texture of finish.

E. Manufacturer's Instructions: Submit preparation requirements, anchor bolt placement, and size.

F. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.

1.7 CLOSEOUT SUBMITTALS

A. Section 01 77 00 – Closeout Procedures: Closeout submittals.

B. Project Record Documents: Record actual locations of concealed components and utilities.

1.8 QUALITY ASSURANCE

A. Perform Work in accordance with AISC S335, AISC S342L, and MBMA Low Rise Building Systems Manual.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience and a member of the Metal Building Manufacturers Association.

B. Erector: Company specializing in performing Work of this section with minimum five years documented experience and approved by manufacturer.

C. Design structural components, develop shop drawings, and perform shop and site work under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Idaho.

1.10 WARRANTY

A. Section 01 77 00 – Closeout Procedures: Warranties.

B. Furnish five year manufacturer warranty for pre-engineered building systems and components.

C. Furnish twenty year warranty to include coverage for exterior pre-finished surfaces color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading. Include coverage for weather tightness of building enclosure elements after installation.

PART 2 PRODUCTS

2.1 PRE-ENGINEERED BUILDINGS

A. Manufacturers:
   1. Butler Manufacturing Co.
   2. Behlen Building Systems
   3. Nucor Building Systems.
   4. Varco-Pruden Buildings.
   5. R&M Steel Company
   6. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS - FRAMING

A. Structural Steel Members: ASTM A36/A36M, A529/A529M Grade 50 and A572/A572M, Grade 50.

B. Structural Tubing: ASTM A500/A500M, Grade B or A501.

C. Plate or Bar Stock: ASTM A529/A529M Grade 50.

D. Anchor Bolts: ASTM A307 Grade A, galvanized.

E. Bolts, Nuts, and Washers: ASTM A325 and ASTM A490.

F. Welding Materials: AWS D1.1; type required for materials being welded.

G. Primer: SSPC Paint 20, Grey.

H. Non-Shrink Grout: ASTM C1107/C1107M; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days.

2.3 COMPONENTS - WALL AND ROOF SYSTEM

A. Sheet Steel: ASTM A653/A653M; G90 zinc coating.

B. Insulation per Section 07 21 16.

C. Joint Seal Gaskets: Manufacturer's standard type.

D. Fasteners: Manufacturer's standard type, galvanized or high performance organic coating, finish to match adjacent surfaces when exterior exposed.

E. Sealant: Manufacturer's standard type, non-staining, elastomeric, skinning.

F. Trim, Closure Pieces, Caps, Flashings, Facias and Infills: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

G. Bituminous Paint: Asphaltic type.

H. Roof Curbs: Insulated metal pre-formed to roof profile, designed for imposed equipment loads, anchor fasteners to equipment, counterflashed to metal roof system.

2.4 COMPONENTS - METAL DOORS AND FRAMES

A. Doors: Specified in Section 08 13 14.

B. Frames: Specified in Section 08 12 14.

2.5 COMPONENTS - OVERHEAD DOORS

A. Overhead Doors: Specified in Section 08 36 13.

B. Overhead Door Frame: Formed steel sections braced to building frame by building manufacturer

2.6 COMPONENTS - WINDOWS

A. Windows: Specified in Section 08 53 13.

2.7 FABRICATION - FRAMING

A. Fabricate members in accordance with AISC Specification for plate, bar, tube, or rolled structural shapes.

B. Anchor Bolts: Formed with straight shank, bottom nut and washer assembled with template for casting into concrete.

C. Girts/Purlins: Rolled formed structural shape to receive siding, roofing sheet.

D. Provide framing for door, window, louver, ventilator, and other openings

2.8 FABRICATION - WALL AND ROOF SYSTEMS

A. Siding: Minimum 24 gauge metal thickness, architectural profile, 1 1/4 to 1 ½ inch deep, lapped male/female edges.
   1. Coverage Width: 36 inches
   2. Panel Length: Full height of the wall without horizontal joints

B. Roofing: Minimum 24 gauge metal thickness, architectural profile, lapped male/female edges fitted with continuous gaskets, galvalume.

C. Liner: Minimum 26 gauge metal thickness, male/female edges

D. Internal and External Corners: Same material thickness and finish as adjacent material, profile brake formed shop cut and factory mitered to required angles. Back brace mitered internal corners.

E. Flashings, Closure Pieces, Fascia, Infills and Caps: Same material and finish as adjacent material, profile to suit system.

F. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive type finish.

2.9 FACTORY FINISHING

A. Framing Members: Clean, prepare, and prime to SSPC Manual requirements.

B. Galvanizing for Nuts, Bolts and Washers: ASTM A153/A153M.

C. Interior Surfaces of Wall Roof Components and Accessories: Precoated enamel on steel finish, color as selected from manufacturer's standard range.

D. Exterior Surfaces of Wall and Roof Components and Accessories: Precoated enamel on steel of Kynar 500 or Hylar 5000 finish, color as selected from manufacturer's standard range.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution.

B. Verify foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position.

3.2 ERECTION - FRAMING

A. Erect framing in accordance with AISC Specification.

B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing.

C. Set column base plates with non-shrink grout to achieve full plate bearing.

D. Do not field cut or alter structural members without approval of Architect/Engineer.

E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.3 ERECTION - WALL AND ROOFING SYSTEMS

A. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

B. Fasten cladding system to structural supports, aligned level and plumb.

C. Locate end laps over supports. End laps minimum 2 inches. Place side laps over bearing.

D. Use exposed fasteners.

E. Install insulation and vapor retarder utilizing manufacturer standard method for attachment.

F. Install sealant and gaskets to prevent weather penetration.

3.4 ERECTION - ACCESSORIES

A. Seal wall and roof accessories watertight and weather tight with sealant.

3.5 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Framing Members: 1/4 inch from level; 1/8 inch from plumb.

C. Siding and Roofing: 1/8 inch from indicated position.

END OF DIVISION

Mechanical Specifications

DIVISION 21 – FIRE SUPPRESSION

SECTION 210000 - FIRE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SCOPE:

A. General:

1. Specification Section 220000, Plumbing General Requirements, is to be included as part of this Section of the specification.

B. Work Included:

1. This section covers the work necessary to design and install a complete, satisfactory, and ready to operate wet pipe fire protection system for heated areas and dry pipe fire protection system for non-heated areas (areas subject to freezing). Hazard classification shall be as required by the State Fire Marshal, local City, IBC, IFC, and applicable NFPA Standards.

C. Qualifications of Installer:

1. All work shall be performed by a qualified, competent, licensed Fire Sprinkler Contractor who can furnish a verified list of satisfactory installations of this type and size, for a period of 5 years or more. Fire sprinkler contractor shall be licensed by the Idaho State Fire Marshal, and shall have in his employ an Engineering Technician (Level III), certified by NICET (National Institute for Certification in Engineering Technologies).

D. System Responsibility:

1. All work required for the fire protection system, including design and installation, shall be the responsibility of the Fire Sprinkler Contractor. Coordination with other trades is critical. Contractor shall coordinate his work with all ductwork, piping, electrical, etc., to ensure that all systems can be installed with a minimum of interference. Sprinkler heads shall be located in the center of ceiling tiles in the 2' dimension and quarter spaced on 12" increments in the 4' dimension. All piping penetrations through finished walls shall be provided with chrome escutcheons. Submittals which are required are only for the purpose of general coordination. Architect/Engineer assumes no responsibility or liability for the design of the system.
2. All monitoring of valves not shown on the electrical drawings shall be within the scope of work for the fire sprinkler contractor. This shall include, but not be limited to, the following: All conduit and wiring as required to monitor post indicator valves, tamper switches, and any other devices required to be supervised by the fire alarm panel. The sprinkler contractor shall also provide all power, wiring and conduit required for a complete and operational dry-pipe system (if required), unless such electrical is shown on the electrical drawings.
3. All dry piping shall be graded to drain back to the riser, regardless of location or presence of heat. Where not possible, piping may be graded to auxiliary drum drip drains. All locations of drains are to be approved by the Architect/Engineer prior to installation. All exposed piping shall be installed as close to ceilings as possible while maintaining appropriate sprinkler deflector clearances and while providing minimum pipe grade per NFPA 13 requirements. Piping shall be designed and installed in a neat and symmetrical manor and shall be coordinated with all other

trades and building features.

4. All wet piping may be installed flat and level but shall be installed so as to minimize the requirements for auxiliary drains. All exposed piping shall be installed as close to ceilings as possible while maintaining appropriate sprinkler deflector clearances. Piping shall be designed and installed in a neat and symmetrical manor and shall be coordinated with all other trades and building features.
5. Existing buildings without sprinkler systems: If an existing building has not previously had a fire sprinkler system, the Sprinkler Contractor is responsible to consult with a Structural Engineer and verify, in writing, that the existing building structure is capable of supporting the required new active sprinkler system.
6. Submittals are required are only for the purpose of general coordination. Architect/Engineer assumes no responsibility or liability for the design of the system.
7. The fire sprinkler system engineering documents must include as a minimum:
    a. The hazard classification, density, water flow and pressure requirements for the sprinkler system design.
    b. The storage arrangement and classification of commodities to be protected.
    c. Confirmation of adequate water supply based on water purveyor data.
    d. Riser location and feed main routing.

1.2 CODES AND STANDARDS:

A. The sprinkler system is to be designed and installed in accordance with the latest applicable building codes, State and Local Fire Marshals requirements, and all applicable NFPA Standards.

PART 2 - PRODUCTS

2.1 SUBMITTALS:

A. The Engineering Technician shall prepare and submit the following submittal data:

1. Complete equipment list of all equipment to be installed, including manufacturer's name and catalog number.
2. Layout drawing of complete sprinkler system indicating relationship of all other overhead items, including ductwork, lights, and structural members.
3. Complete details and sections as required to clearly define and clarify the design.
4. Plot plan indicating location of all underground connections, piping, valves, and related items.
5. Complete building section showing location of piping, sprinklers and applicable equipment in relation to other construction features.
6. Grooved joint couplings and fittings shall be shown on drawings and product submittals, and be specifically identified with the applicable style or series number.
7. Sprinklers shall be referred to on drawings, submittals and other documentation, by the sprinkler identification or model number as specifically published in the appropriate agency listing or approval. Trade names or other abbreviated designations shall not be allowed.
8. Sprinklers valve and equipment model numbers shall be specifically identified on drawings and shall match submittal data provided.

2.2 MATERIALS AND EQUIPMENT:

A. All materials shall be as specified below, or in accordance with applicable NFPA Standards:

1. Piping shall be black steel per NFPA 13 requirements and shall have a factory applied interior MIC or corrosion resistant coating. Piping shall be new and relatively

free of exterior rust or corrosion. Piping with excessive rust or corrosion may be rejected. Threadable, thin wall piping will not be allowed. CPVC is allowed for underground only.

2. Fittings shall be 125 psi screwed cast or malleable iron for all threaded piping.
3. Fittings shall be Victaulic FireLock®, Anvil Gruviok, Grinnell or Shurjoint fire protection products for all grooved or plain end piping. Couplings shall consist of two ductile iron housings conforming to ASTM A536, a pressure responsive elastomer gasket, and zinc electroplated carbon steel bolts and nuts. Rigid type or flexible type where necessary.

    a. Rigid Type: Housings shall be cast to provide system rigidity and support and hanging in accordance with NFPA 13. Tongue and recess rigid type couplings shall only be permitted if the contractor uses a torque wrench for installation. Required torque shall be in accordance with the manufacturer's recommendations. Contractor shall remove and replace any improperly installed joints. 11/4" and Larger: Standard rigid joint equal to Victaulic FireLock® Style 009 or equal.
    b. Flexible Type: Use in seismic areas where required by NFPA 13, Victaulic Style 75 or 77 or equal.

4. Dry pipe valves shall be installed in system risers per local water purveyor requirements.

    a. Dry Pipe Valve: Reliable EX Low Pressure Dry Valve (or preapproved equal, prior to award) shall be provided. Low differential, latched clapper design, black enamel coated ductile iron body, aluminum bronze clapper, with external reset and nitrogen system trim package. Valve internal parts shall be replaceable without removing the valve from the installed position and be externally resettable. Valve shall be pre-trimmed with shut-off valve, 3-way ball valve, and actuator. Required system pressure shall be per manufacturer's requirements. Valve shall have grooved ends for vertical installation only.
    b. Dry pipe systems shall not exceed 750 gallons of total system volume for any reason, regardless of code allowances. The Fire Sprinkler Contractor is to determine how many systems are required and provide the correct number of systems as determined by their design.

5. Wet pipe risers shall be equipped with a Reliable brand (or equal) alarm valve / system check valve.
6. Butterfly control valves with supervisory tamper devices shall be installed for system control.
7. All materials and equipment shall conform to the requirements of Underwriter Laboratories (UL) or Factory Mutual Global (FMG), and shall be so stamped.
8. Pressure switches (water flow device) shall be installed in each system riser (dry pipe systems).
9. Flow switches (water flow device) shall be installed in each system riser (wet pipe systems).
10. Alarm Bell shall be 10-inch outdoor electric bell. Furnish for installation by the electrical contractor.
11. Sway Bracing, both lateral and longitudinal, shall be required and shall be installed per applicable NFPA Standards.
12. Fire Department Connection shall be provided for each system riser or manifold assembly. Install a 90-degree elbow with drain connection at each fire department connection to allow for system drainage to prevent freezing.
13. Sprinkler heads in main entry type areas and main conference room type areas shall be concealed flush mounted style with white paintable covers. All other sprinkler heads shall be Reliable Designer Model F1, (or equal), recessed with

compression type escutcheon, below finished ceilings. Where surface mounted obstructions are installed, two-piece escutcheons and pendent sprinklers may be used, if required. Where sprinkler heads are subject to damage such as gymnasiums or mechanical lofts all sprinkler heads shall be provided with protective covers. Escutcheons shall be listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer. Where piping is exposed, install standard bronze upright or pendent sprinklers. Quick response dry sidewall sprinklers shall be used as required to comply with IBC requirements for exterior canopies.

14. Provide 12 extra sprinkler heads mounted together in a suitable cabinet. Include Reliable brand sprinkler head wrenches matching each type of sprinkler head. Include spares of all types of sprinklers installed in the building.
15. Hangers, drains, and Inspectors Test Connections shall be installed in accordance with applicable NFPA Standards.
16. Test and Drain Valve: Globe design valve providing test port with ½" integral orifice and drain port in one unit. Bronze body with copper alloy internals, polycarbonate sight glasses, Nitrile o-rings and EPDM valve seats.
17. Back flow prevention as required by the State and Local Fire Marshall.
18. Post indicator valves as required by the State and Local Fire Marshall, or as shown on plans.
19. All piping penetrations through finished walls shall be provided with chrome escutcheons.

B. Underground piping materials and installation shall comply with N.F.P.A. #24 and local water company specifications.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Upon completion of the system, secure the inspection of the required authorities and perform such tests as may be required to demonstrate compliance with local and state standards. Upon acceptance of the system by the inspecting authority, inform the Architect/Engineer in writing, showing proof of acceptance. Submit all required test certificates to required authorities.

B. The Fire Sprinkler Contractor shall monitor the nitrogen percentages until the system has reached 98% pure nitrogen and shall provide written verification, signed and acknowledged by the Owner's representative of such achievement. This shall occur each time that the system is taken in and out of service for any reason connected to the requirements of the project.

3.2 INSTALLATION:

A. Grooved joint piping systems shall be installed in accordance with the manufacturer's guidelines and recommendations. All grooved couplings, fittings, valves and specialties shall be supplied by a single manufacturer. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. Gaskets shall be supplied by grooved pipe manufacturer. Grooved end shall be clean and free from indentations, projections and roll marks in the area from pipe end to groove for proper gasket sealing. Contractor's field personnel shall be properly trained in the installation of the manufacturer's grooved piping products. A Factory trained representative shall periodically review the product installation. Contractor shall remove and replace any improperly installed products.

B. The sprinkler bulb protector must remain in place until the sprinkler is completely installed

and before the system is placed in service. Remove bulb protectors carefully by hand after installation. Do not use any tools to remove bulb protectors.

3.3 PROJECT CLOSEOUT

C. Operations & Maintenance Manual:

1. The Contractor shall provide an operations and maintenance manual at least thirty days prior to completion of work. The manual shall be of the three-ring binder type, entitled "Operations and Maintenance Manual", with the job name and year of completion also included. O & M manuals shall be submitted in a single package. In addition, the contractor shall provide two consolidated electronic versions on two separate thumb drives. Individual items will not be accepted independently unless approved by the Engineer. The manual shall be in accordance with NFPA 25 requirements.

END OF SECTION

DIVISION 22 – PLUMBING

SECTION 220000 – PLUMBING GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE:

A. General:

1. The Bidding Requirements, Contract Requirements, and the General Requirements (Division 01) of these specifications shall govern all parts of the work.

B. Work Included:

1. Install work in accordance with these specifications and the accompanying plans. Furnish all labor, material, and equipment together with all incidental items not specifically shown or specified which are required by good practice to provide the complete plumbing systems as described.

C. Coordination and Site Visits:

1. This section of the work requires examination of and reference to all architectural, structural, utility, and electrical drawings for construction conditions that may affect the work. Inspect the building site and existing facilities for verification of existing conditions. Base all measurements from established benchmarks. Any discrepancy between actual measurements and those indicated, which prevents following good practices or the intent of the drawings and specifications, shall be reported to the Architect/Engineer, and work halted until instructions are received from the Architect/Engineer.

1.2 CODES, PERMITS, FEES:

A. Install all work in accordance with applicable codes and standards. Obtain all required permits; pay all required fees including utility connections or extensions, in connection with this portion of the construction. Obtain all required certificates of inspection for the work.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP:

A. Materials:

1. All materials and equipment shall be of first quality, new, full size and weight, standard in every respect, and suitable for the space required. Use the same manufacturer for products of similar class or service, such as valves and pumps. Protect all materials against loss, theft, or damage before and after installation.
2. Furnish and install all necessary foundations, supports, pads, bases, and piers required for all materials and equipment furnished under this contract.
3. Provide all required firestopping at piping penetrations of fire rated walls, floors, ceilings, and roofs. Firestopping shall be Dow Corning Fire Stop Sealant 2000 or Fire Stop Foam 2001, or approved equal.
4. Provide a heat-expanding fire collar for all non-metallic piping up to 6” size at

penetrations of fire rated walls, floors, and ceilings per ASTME 814.

B. Workmanship:

1. All materials and equipment shall be installed in a neat and workmanlike manner by competent specialists for each subtrade. Work shall be installed to the satisfaction of the Architect/Engineer with unsatisfactory work removed and reinstalled to his satisfaction at no extra cost to the Owner.
2. Provide all cutting and patching necessary to install the work specified in this section. Patching shall match adjacent surfaces. No structural members shall be cut without the approval of the Architect/Engineer. Provide all sleeves and inserts required before the floors and walls are built.
3. Locate all equipment that must be serviced in fully accessible positions. Provide clearance for removal of replacement parts and components, and with necessary couplings or flanges to remove the component for maintenance.

2.2 SUBMITTALS AND SUBSTITUTIONS:

A. Prebid Approval:

1. Manufacturer’s trade names and catalog numbers stated herein are intended to indicate the quality of equipment or materials desired. All manufacturers not specifically listed require prior approval. Submit catalog data, including specifications, of the proposed equipment to the Architect/Engineer for his approval at least 10 calendar days prior to bid opening. Notice of such approvals will be published in an addendum. Approval of listed alternate equipment manufacturers is for bidding only. Final approval is to be based on requirements of the plans and specifications.

B. Submittals:

1. Within thirty days after award of this contract, provide an electronic copy of a complete list of all materials and equipment proposed for this project. List shall contain make, type, manufacturer's name, and trade designation of all materials and equipment. Submittal shall also include manufacturer's complete specification for each item, including ratings, and dimensions as required to check space requirements. The scheduled equipment is the basis of design for physical size, etc. Alternate manufacturers shall not exceed the weight or physical size. Any changes to the Architectural, Structural and Mechanical systems due to alternate manufactures shall be the responsibility of the Contractor and Supplier. Submittals for fixtures, trim, and other plumbing related items, requiring submittals, shall be submitted in a single complete package. Individual items will not be reviewed independently unless approved by the Engineer.
2. Approval of submittals shall not relieve the contractor from responsibility for deviations from the plans or specifications, unless he has, in writing, called the Architect's /Engineer's attention to deviations at the time of submission, and obtained his written approval. Approval of submittals does not relieve the contractor from responsibility for errors in shop drawings or literature.

C. Equipment Requiring Submittals:

1. Plumbing Fixtures & Trim
2. Valves
3. Cast Iron Soil Piping
4. Pipe Stands

PART 3 - EXECUTION

3.1 ACCESSIBILITY & SAFETY:

A. Accessibility:

1. All equipment which must be serviced or operated shall be located in fully accessible position. Minor changes from the drawings may be made to allow for better accessibility. All changes shall be approved prior to actual installation.
2. Access panels shall be provided if required for accessibility. Access panels to be steel, flanged, hinged doors by Cendrex, model AHD, or equal. Size as required for installation. Subcontractor shall furnish the required panels to the General Contractor and the required location for all access panels, unless otherwise specified in the Architectural specifications. Panels shall be installed by the General Contractor.

B. Safety:

1. No water piping shall run immediately over or within a 3-foot plan view clearance of any electrical panel or motor starter. Where piping must be located within these zones, install piping inside a conduit to prevent water access to electrical equipment.

3.2 COORDINATION:

A. Coordinate all work with the various trades involved to provide a complete and satisfactory installation. The exact details of piping and equipment are not shown. No additional compensation will be made for offsets or relocation required in coordination with other trades.

B. Alterations required due to improper supervision by the subcontractor shall be made at no extra cost, to the satisfaction of the Architect/Engineer.

3.3 EXCAVATION & BACKFILL:

A. Excavate trenches required for underground piping to proper elevation and grade. Provide trenches with solid bottoms to allow support of piping along entire length with excavation at bells as required for jointing and inspection. Provide repairing of finished surfaces, and all required shoring, bracing, pumping, and protection for safety of persons and property. Observe all Local or State Safety Codes. Verify that elevations of existing utilities will allow for proper grading of piping connecting to existing utilities.

B. Excavation and Backfill shall be in accordance with the requirements of Division 31, of these specifications.

3.4 IDENTIFICATION AND CODING:

A. General:

1. The Contractor shall use ASME 13 standards for all piping identifications, color

coding, and compliance.

B. Painting:

1. All painting of equipment, accessories, and piping shall be furnished and applied under the Architectural section of these specifications. All painting shall be completed before any identification markings are applied.

C. Piping:

1. Identify all piping as to the service of the pipe and the direction of flow. The letters shall be 3/4 inch high on piping two inches or smaller, and 1-1/4 inches high on piping up to six inches. Flow arrows shall be at least six inches long. The letters and flow arrows shall be made by precut stencils and oil base paint, one inch high and black, or factory fabricated plastic pipe markers. Piping shall be identified at 25 foot maximum intervals, on long continuous lines; adjacent to each item of equipment; on each riser and junction, and on both sides of all wall penetrations. Underground piping shall be identified with bright colored continuously printed plastic tape of not less than 6" wide by 4 mil thick, manufactured for direct burial service. Install directly above all buried pipe, 6 to 8 inches below finished grade.

D. Valves:

1. Regardless of size, all valves shall be tagged with a numbered brass tag, 1-1/2 inches by 3 inches minimum in size and 0.051 inch thick. A valve chart indicating valve tag number, location, service, and normal position shall be mounted in a suitable framed and glassed cover in the main mechanical room or as directed. Valve chart shall be duplicated in the Maintenance and Operations Manual.

3.5 TESTING:

A. Piping:

1. All plumbing piping (drainage, water, gas) shall be tested in accordance with the requirements of local adopted plumbing code, latest edition. Other piping systems shall be tested hydrostatically to 1.5 times the operating pressure but not less than 100 psi, for a minimum period of two hours. If the test pressure falls more than 5 percent during the test period, the leak shall be located, repaired, and the test repeated.
2. Piping shall be tested before insulation has been installed. Delicate control mechanisms shall be removed during tests to prevent shock damage. The use of chemicals or compounds to stop leaks shall not be permitted.
3. A test report shall be submitted for each piping system test. Test report forms are part of Specifications Section 220100, or are available from the Engineer.

B. Systems:

1. All plumbing systems shall be tested at the completion of the building to establish that the systems operate as specified and required.

3.6 CLEANING AND ADJUSTING:

A. Thoroughly clean all parts of the system at the completion of the work. Flush all water circulating systems with fresh water and then drain. Clean all strainers and refill system. Adjust all devices for proper operation and lubricate all equipment as required. Repaint any painted surface that has been damaged.

B. All potable water systems shall be flushed and disinfected after tests are completed. Disinfection shall be in accordance with local municipal and State Plumbing Inspector's criteria. In lieu of such criteria, the following procedure shall be followed for disinfection:

1. Completely flush system. Add alkali or acid (hydrochloric) to bring water ph level to between 7.4 and 7.6.
2. Inject chlorine (liquid, powder, tablet, or gas) throughout the system to obtain 50 to 80 mg/L residual.
3. Bleed water from outlets to ensure distribution, and test for residual at a minimum of 15 percent of the outlets.
4. Maintain disinfection in system for 24 hours.
5. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
6. Flush disinfectant from system until residual is equal to that of incoming water, or 1.0 mg/L.
7. Take samples no sooner than 24 hours after flushing, from 10 percent of the outlets and the incoming water.

3.7 PROJECT CLOSEOUT:

A. Operations & Maintenance Manual:

1. The Contractor shall provide an operations and maintenance manual at least thirty days prior to completion of work. The manual shall be of the three ring binder type, entitled "Operations and Maintenance Manual", with the job name and year of completion also included. O & M manuals shall be submitted in a single package. Individual items will not be accepted independently unless approved by the Engineer. The manual shall include, as a minimum:
2. Maintenance instructions for all equipment, including lubrication requirements.
3. Fixture suppliers names, addresses, and telephone numbers.
4. Fixture catalog cuts, ratings tables, model numbers, serial numbers, and accessories.
5. Parts numbers for all replaceable parts.
6. Valve tagging chart as hereinbefore specified.
7. Guarantee letter as specified below.
8. Any additional information required to enable the Owner to properly maintain the building plumbing system.
9. After approval of the Operations and Maintenance Manual by the Architect/Engineer, the Contractor shall furnish two copies of the manual to the Owner.

B. As-Built-Drawings:

1. Provide two sets of red-line mechanical drawings showing the work as it was actually installed. The drawings shall indicate all departures from the contract drawings and shall locate all underground utility lines with dimensions from established building lines. Make all notations neat and legible, with red indelible pencil. At the completion of the work, these as-built drawings shall be signed and dated by the Plumbing Contractor and returned to the Architect/Engineer.

C. Guarantee:

1. All work furnished under this section shall be guaranteed in writing to be free from defective work or materials for a period of one year after acceptance of the contract. All repairs or replacements because of defective materials or workmanship or noncompliance with code shall be provided without additional cost to the Owner. Contractor shall furnish a letter indicating above guarantee with space for date of

acceptance and expiration of guarantee. Letter shall be included in O & M Manual.

END OF SECTION

SECTION 220100 - PLUMBING

PART 1 - GENERAL

1.1 SCOPE:

A. This section covers the work necessary for the plumbing system, complete. The Plumbing General Requirements, Section 220000, are to be included as a part of this section of the specifications.

1.2 CODES:

A. The plumbing system shall be installed in accordance with the requirements of local adopted plumbing code, latest edition, International Fuel Gas Code, latest edition; and all local and State Codes.

1.3 FIXTURES & EQUIPMENT:

A. General:

1. Plumbing fixtures and equipment shall be as listed on the drawings. In addition to those specifically listed, the following manufacturers are approved for bidding only. All other manufacturers require prior approval. Final approval for installation is based on submittal data furnished:

a. Tank Type Water Closets: American Standard, Kohler, Mansfield, Sloan, Toto, & Zurn.
b. Urinals: American Standard, Briggs, Gerber, Kohler, Mansfield, Sloan, Toto & Zurn.
c. Vitreous China Sinks: American Standard, Crane, Kohler, Mansfield, Sloan, Toto, & Zurn.
d. Stainless Steel Sinks: Elkay, Just.
e. Faucets: American Standard, AMTC, Aquaspec, CHG Encore Saniguard, Chicago Faucets, Delta, Elkay, Gerber, Geberit, Kohler, Moen, T&S Brass, Symmons, Speakman, Sloan & Zurn.
f. Sensor Faucets: Chicago Faucets, Elkay, Mac Faucets, Symmons, Speakman, Sloan, & T & S Brass.
g. Valves and Trim: Brasscraft, Dearborn Brass, ProFlo, Sloan & T&S Brass.
h. Flush Valves: American Standard Selectronic, AMTC, Delta, Kohler, Moen (sensor-operated only) Sloan, & Zurn.
i. Carriers and Drainage Products: Jay R. Smith, Josam, MIFAB, Neenah Foundry, NDS, Sun Drainage, Wade, Watts, & Zurn.
j. Toilet Seats: American Standard, Beneke, Church, Kohler, Plumb Tech & Zurn.
k. Mixing Valves: Acorn Controls, Lawler, Leonard, Powers, Stingray, Symmons, Watts, & Wilkins.
l. Fiberglass/ Acrylic Fixtures: Aquatic, Aquaglass, Best Bath, Fiat, Intersan, MAXX, Mustee Praxis-Comfort Designs, & Swan.
m. Drinking Fountains/ Electric Water Coolers: Elkay, Halsey Taylor, Haws, Murdock Stern Williams, & Sunroc.
n. Safety Fixtures & Safety Mixing Valves: Acorn, Bradley, Chicago Faucets, Encon, Guardian, Haws, Lawler, Speakman, Speakman, Stingray.
o. Service Sinks: Acorn, Fiat, Mustee, Proflo, Stern Williams, & Zurn.
p. System Valves: Apollo, Nebco & Red-White Valve Corp.
q. Backflow Preventers: Conbraco/Apollo, Watts, & Wilkins.
r. Hose Bibbs: Josam, J.R. Smith, Prier, Woodford, & Zurn.

s. Trench Drains: ABT, ACO, Dura Trench, J.R. Smith, NDS, Strongwell Polycast, Rapid, Wade, & Zurn.
t. Utility Sinks: Fiat, Mustee, & Proflo.

2. Plumbing Fixture Standards:

a. All plumbing fixtures shall meet or exceed the following standards:
b. ANSI A112.6.1 - Supports for Off-the Floor Plumbing Fixtures for Public Use.
c. ANSI A112.18.1 - Finished and Rough Brass Plumbing Fixture Fittings.
d. ANSI A112.19.1 - Enameled Cast Iron Plumbing Fixtures.
e. ANSI A112.19.2 - Vitreous China Plumbing Fixtures.
f. ANSI A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use).
g. ANSI A112.19.4 - Porcelain Enameled Formed Steel Plumbing Fixtures.
h. ANSI A112.19.5 - Trim for Water-Closet Bowls, Tanks, and Urinals.
i. ANSI Z358.1 - Emergency Eye Wash and Shower Equipment.
j. ARI 1010 - Drinking Fountains and Self-Contained Mechanically Refrigerated Drinking Water Coolers.
k. AWSI/ASSE 1001 – Atmospheric Vacuum Breaker
l. ANSI/ASSE 1012 - Backflow Preventers with Immediate Atmospheric Vent.
m. ANSI/ASSE 1011 - Hose Connection Vacuum Breakers.
n. ANSI/ASSE 1013 - Backflow Preventers, Reduced Pressure Principle.
o. ANSI/ASSE 1015 – Backflow Preventers, Double Check Principle
p. ANSI/ASSE 1019 - Wall Hydrants, Frost Proof Automatic Draining Anti-Backflow Types.
q. AWSI/ASSE 1020 – Pressure Vacuum Breaker
r. AWSI/ASSE – 1-52 – Hose Connection, Double Check
s. ANSI A112.21.1 - Floor Drains.
t. ANSI A112.26.1 - Water Hammer Arresters.
u. PDI WH-201 - Water Hammer Arresters.
v. ANSI/AWWA C606 – Grooved and Shouldered Joints
w. NSF/ANSI Standard 61 – Drinking Water System Components – Health Effects

PART 2 - PRODUCTS

2.1 PLUMBING FIXTURES & TRIM:

A. All plumbing fixtures shall be provided complete with all required trim for a complete and operational system. All piping penetrations through finished walls shall be provided with chrome escutcheons. All plumbing fixtures shall be caulked and sealed to surrounding surfaces. All sink traps shall be provided with a cleanout plug in the bottom of the trap. All interior exposed pipe, valves, and fixture trim shall be chrome plated, including kitchen compartment sinks. Braided stainless steel pipe risers are approved for concealed locations only, such as behind casework doors or lav shields. Each fixture shall be provided with stop valves and the stop valves shall be quarter-turn brass ball type. All fixtures and trim must be lead free. All floor drains and floor sinks shall be provided with trap primers (PPP, Zurn or Wade as needed for appropriate use. Provide ball valve type shut-off valve upstream of all trap primer valves).

2.2 PIPING AND FITTINGS:

A. General:

1. Underground sanitary sewer and storm drain lines shall be installed at 1/4" per foot slope, unless otherwise indicated. If such slope is not possible due to existing

inverts, approval shall be obtained from the Architect/Engineer and the authority having jurisdiction before any piping is installed at a lesser slope.

2. Connections between piping of dissimilar materials shall be made with dielectric waterway fittings or unions.
3. Provide standard manufactured water hammer arresters at all flush valves. Size and locate per manufacturers recommendations. Provide access panels for access to all water hammer arresters.

B. Domestic & Non-Potable Hot and Cold Water:

1. Piping inside building above slab or above grade in crawl space shall be ASTM B88, Type "L", hard drawn copper. Fittings shall be ANSI/ASME B16.22 cast brass, or ANSI/ASME B16.29 wrought copper. Joints shall be ANSI/ASTM B32 solder, Grade 95-5, lead free.

    a. Cold Water Only Option- ANSI/ASME B16.18 cast bronze, or ANSI/ASME B16.22 wrought copper. Joints shall be copper-tube dimensioned grooved joint couplings, and Flush Seal style gasket. (Gasket shall be UL classified in accordance with ANSI/NSF-61 for potable water service.) Victaulic Style 606, Gruvlok style 6400, Grinnell Universal Tongue and Groove 672, Shurjoint C305, or equal.
    b. Piping Option – Mechanically Formed Extruded Outlets:

1) Mechanically formed extruded outlets shall be perpendicular to the axis of the run tube (header). They shall be formed by drilling a pilot hole and drawing out the tube surface to form a collar having a height of not less than three times the thickness of the branch wall and shall conform to ASME B31.9 and NFPA 99. T-Drill or approved equal.
2) Branch tubes shall not restrict the flow in the run tube. To ensure this by conforming the branch tube to the shape of the inner curve of the run tube, a dimple / depth stop shall be formed in the branch tube to ensure that penetration into the collar is of the correct depth. For inspection purposes, a second dimple shall be placed 0.25 inch above the first dimple. Dimples shall be aligned with the tube run.
3) Branches can be formed up to the run tube size as shown in ASTM F 2014. Forming procedures shall be in accordance with the tool manufacturer’s recommendations.
4) Joints shall be made with the use of approved brazing alloys BCup2 thru BCup5 (0-15% silver content). Brazed with a filler that has a melting point above 540 deg. Centigrade (1000 deg. F). **Soft soldered joints are not allowed.**
5) K and L copper types allowed.
6) Soft and Hard copper allowed.
7) Each model used for making branch connections shall be permanently marked with manufacturer’s name and appropriate model number.
8) Mechanically formed extruded outlets can (but not limited to) be used on commercial and residential buildings.
9) Fitter / Plumber shall be trained and certified to operate the equipment.

2. Piping underground within 5 feet of the building line, smaller than 4 inches, shall be ASTM B88, Type "K", hard drawn copper. Piping below floor slab, smaller than 4 inches, shall be type “K”, soft annealed copper. Fittings shall be ANSI/ASME B16.29 wrought copper. Joints shall be ANSI/ASTM B32 solder, Grade 95-5, lead free. No joints shall be installed beneath concrete floor slabs, unless approved by the Engineer. Underground or underslab copper piping shall be provided with a polyethylene jacket, ANSI/AWWA C105, or shall be wrapped with double layer, half-lapped, 10 mil polyethylene tape.
    a. Underground (below slab) Piping Option- ½” to 4”, High Density Polyethylene (HDPE) pressure pipe. ASTM D3350, ASTM D3035 & ASTM F714. AWWA C901 & AWWAC906, NSF. Fittings shall be HDPE, solvent weld. Piping shall be rated for not less than 150 psig.
    b. Trap Primer Piping (below floor or concealed only)
3. Piping underground beyond 5 feet from building line shall be Schedule 40 PVC, ASTM D1785 or D2241. Fittings shall be PVC, ANSI/ASTM D2466. Joints shall be solvent weld, ASTM D2855, or gasketed, ASTM F477. Piping shall be rated for not less than 150 psig pressure.

C. Sanitary Sewer and Vent:

1. Piping and fittings shall be Schedule 40 PVC-DWV (cellular core), per ASTM F1488 and ASTM F891, solvent welded per solvent manufacturer’s instructions, or ABS Schedule 40 piping and fittings per either ASTM D2661 or ASTM F628 with solvent cement conforming to ASTM D2235. All sewer risers (2 story or more) shall be service weight cast iron, no-hub or single-hub, ASTM A74. All piping penetrations through fire rated walls, floors, or ceilings, and all piping located above ceilings used as return air plenums shall also be cast iron or galvanized steel, ASTM A53. Underground PVC-DWV piping shall be installed per ASTM D-2321.
2. Piping and fittings beyond 5 feet from the building line shall be PVC, ASTM D3033 or D3034, SDR 35. Joints shall be ASTM F477 with elastomeric gaskets. Underground piping shall be installed per ASTM D-2321.
3. All 90 degree waste line elbows shall be formed per the latest issue of the adopted plumbing code, latest edition.
4. All exposed vent piping located in occupied areas or rooms, is to be cast iron with cast iron fittings.
5. All flush valve fixtures that are installed back to back shall have offset waste outlet fittings.
6. Cleanouts shall be provided at each horizontal drainage pipe, at its upper terminal, and each run of piping which is more than 100 feet and shall be provided for each 100 feet developed length, or fraction thereof of such piping. An additional cleanout shall be provided for each aggregate horizontal change of direction exceeding one hundred and thirty-five degrees, per applicable plumbing code. This shall be provided regardless of what is shown on the drawings.
7. All floor drains, floor sinks, and hub drains shall be installed with a trap primer.
    a. Flush Valve Primer: Trap primer shall be Precision plumbing products model FVP-1VB with vacuum breaker.
    b. Pressure Activated Primer: Trap primer shall be Precision Plumbing products Model CPO-500 with DU distribution unit if required.
    c. Tail Piece Primer: Trap primer shall be Precision Plumbing Products Model LTP-1500 with ½” clear poly flexible priming make up water line and chrome plated escutcheons plates.

8. All vent's through roof (VTR'S) shall be extended at least 1 foot above the roof surface, or to the top of the closest adjacent parapet wall, whichever is greater.

D. Compressed Air:

1. Piping shall be Schedule 40 black steel pipe, ASTM A53, with black banded 200 pound malleable iron fittings and couplings.
2. Piping 2" and below may be ASTM A-312, Type 304/304L, Schedule 5S stainless steel in lieu of soldered copper.
    a. Fittings shall be precision, cold drawn austenitic stainless steel with elastomer O-ring seals. (O-ring shall be grade "E" EPDM for oil free compressed air, or grade "T" Nitrile for air with oil vapors) Vic-Press 304 or equal.
3. Alternate material - Piping inside building above slab or above grade shall be ASTM B88, Type "L", hard drawn copper. Fittings shall be ANSI/ASME B16.23 cast brass or ANSI/ASME B16.29 wrought copper. Joints shall be ANSI/ASME B32 solder, Grade 95-5, lead free.

E. Propane Gas:

1. Piping shall be Schedule 40 black steel pipe, ASTM A53. Exposed fittings 2 inches and smaller shall be ANSI/ASME B16.3, screwed, black malleable iron.
2. Fittings larger than 2 inches and all underground fittings shall be Schedule 40 steel butt-welded type. Underground piping shall be provided with a polyethylene jacket, ANSI/AWWA C105, or shall be wrapped with double layer, half-lapped, 10 mil polyethylene tape.
    a. Contractors Option for Underground Pipe:
    1) Gastite Type PE flexible corrugated gas piping. NFPA-54 & 56. ASTM D2513 Category 1. ASME D-B31.8-1995.
    2) Piping and fittings underground and outside the building line may be JM Eagle UAC 2000 MDPE, medium-density polyethylene yellow gas pipe or an approved equal. Piping shall be installed in accordance with JM Eagle Publication JME-12B, "Polyethylene Yellow Gas Distribution Installation Guide." JM Eagle's UAC 2000 system can be joined by butt heat fusion, socket fusion, or saddle fusion. Installing contractor shall be licensed for fusion pipe installation of polyethylene pipe. ASTM D2513.
3. All exterior piping exposed to the weather shall be coated with a rust inhibitor – Rustoleum #866 Pro-Guard Primer – yellow or gray color – or approved equal.

F. Condensate Drain Piping:

1. Exterior to building or located within a plenum: Piping shall be Type L hard drawn copper, ASTM B88, with solder joints. Copper piping shall not be used on 90% condensing type equipment.

1. Interior: Piping shall be Type L hard drawn copper, ASTM B88, with solder joints, grade 95TA, or may be Schedule 40 PVC. Copper piping shall not be used on 90% condensing type equipment. Provide a neoprene or rubber gasket at all copper piping support hangers to inhibit corrosion.
    a. Inside Mechanical Rooms: Piping shall be Type L hard drawn copper, ASTM B88, with solder joints, grade 95TA, for durability reasons.

G. Hanger and Supports:

1. Pipe hangers shall be provided to adequately support all piping systems. Hangers shall be vertically adjustable to provide for proper pitch and drainage. Hangers shall allow for expansion and contraction of the piping system. Reference “General Regulations” of the latest edition of the adopted plumbing code, latest edition.
2. Hangers for pipe sizes 1/2 to 6 inches shall be adjustable clevis type, or unistrut saddles with all-thread hanger rod.
3. Hangers for hot pipe, sizes 6 inches and over shall be adjustable steel yoke, cast iron roll, double hanger type.
4. Vertical pipes shall be supported with steel riser clamps. Spacing interval requirements per “General Regulations” of the latest edition of the adopted plumbing code, latest edition.
5. All insulated piping shall be provided with minimum 18 gauge galvanized insulation shields, 12 inches long, and oversized hangers. Pipe sizes 2 inches and over shall also be provided with 12 inch long calcium silicate insulating blocks between the piping and the galvanized insulation shield.
    a. Alternate: Insulated pipe support inserts may be provided at hanger, support, and guide locations on piping requiring insulation. The insert should consist of either Hydrous Calcium Silicate or Polyisocyanurate Foam insulation (Urethane) encircling the entire circumference of the pipe with a 360 deg. PVC (1.524 mm thick) or galvanized steel jacket and installed during the installation of the piping system. These insulated pipe support inserts shall be provided by the Mechanical Contractor and installed by the same during pipe support installation.
6. Hanger rod sizing and spacing for pipe shall be as follows:

Pipe Size	Minimum Rod Diameter	Maximum Spacing
To 1-1/4 inches	3/8 inch	6.5 feet
To 2 inches	3/8 inch	10 feet
To 3 inches	1/2 inch	10 feet
To 6 inches	5/8 inch	10 feet
8 to 12 inches	7/8 inch	12 feet
PVC & ABS (all sizes)	3/8 inch	4 feet
Cast Iron No-Hub	5/8 inch at joints	5 feet and

7. Provide hangers within 12 inches of each horizontal elbow.
8. Provide hangers with minimum 1-1/2 inches vertical adjustment.

H. Ethylene-Propylene (EPDM) Piping

1. Brine facility piping shall be Ethylene-Propylene (EPDM) piping with a reinforced polyethylene helix. EPDM piping shall include the following ratings:
    a. Working Pressure at 72°F: 90-psi
    b. Vacuum Rating at 72°F: 29.8-In Hg
    c. Minimum Bending Radius at 68°F: 7-inches
    d. Weight: 1.25 lbs/ft
    e. Temperature Range: -40°F to 140°F
    f. Type: Suction and Discharge
    g. Application: Brine chemicals

2.3 INSULATION:

A. General:

1. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
2. Fire-Test-Response Characteristics: Insulation and related materials NFPA 255, UL Classified per UL 723 or meeting ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement containers, with appropriate markings of applicable testing and inspecting agency.
    a. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
    b. Insulation Installed Outdoors: Flame=spread index of 75 or less, and smoke-developed index of 150 or less.

B. Piping:

1. All domestic, potable & non-potable, hot and cold water lines and rain drains shall be insulated with preformed insulation.
    a. Fiberglass insulation with a vapor barrier jacket. Insulation shall have a conductivity not exceeding 0.28 Btu-inch/hour-sq. ft.-degrees F. Laps and butt joints shall be sealed with pressure sensitive joint sealing tape of the same finish as the insulation jacket to provide a continuous vapor seal. Fittings and valves shall be insulated with PVC fitting covers and fiberglass insulation inserts, or with hydraulic setting insulating cement and four ounce canvass jacket with vapor barrier adhesive.
    b. Alternate material for Cross-Linked Polyethylene Tubing (PEX): One piece preformed flexible elastomeric closed cell foam with built-in vapor barrier. Seal laps and butt joints with moisture resistant adhesive to provide a continuous vapor seal. Insulation shall have a conductivity rating not exceeding 0.27 Btu-inch/hour-sq. ft.-°F.

Insulation thicknesses shall be as follows:

System	Pipe Sizes ½" and above
Domestic Cold Water (pot. & non-pot.)	½"
Domestic Hot Water & Recirc. (pot. & non-pot.)	1"

2. Insulation shall be installed in strict accordance with manufacturer's instructions.
3. Insulation shall be continuous through penetrations.
4. All insulation shall be installed in a neat and workmanlike manner.

2.4 VALVES & STRAINERS:

A. Gate Valves:

1. Valves 2-inches and smaller shall be cast bronze body, ASTM B-62, rising stem, 200 psi WOG. Stems shall be dezincification-resistant silicon bronze, ASTM B-371, or low-zinc alloy, ASTM B-99, NSF/ANSI 61-8 Annex F&G, NSF 372 Lead Free. If unable to use a rising stem valve due to inadequate clearance, use non-rising stem gate valve. Valves shall comply with MSS SP-80. Valves over 2-inches shall be iron body, bronze trim, rising stem and hand wheel, flanged ends. Valves shall comply with MSS SP-70. Valves mounted higher than 7'-0" A.F.F. shall be provided with chain, wheel, and guides. Basis

of design: Apollo # 101T-LF/101S-LF Lead Free Bronze, Apollo #611F-LF Lead Free Cast Iron, or equal.

B. Globe Valves:

1. Valves 2-inches and smaller shall be cast bronze body, ASTM B-62, renewable composition disc, 200 psi WOG, ASTM B-62, rising stem and hand wheel. Stems shall be of dezincification-resistant silicon bronze, ASTM B-371, or low-zinc alloy, ASTM B-99, NSF/ANSI 61-8 Annex F&G, NSF 372 Lead Free. Valves over 2-inches shall be iron body, bronze trim, rising stem and hand wheel, plug type disc, flanged ends. Valves shall comply with MSS SP-85. Valves mounted higher than 7'-0" A.F.F. shall be provided with chain, wheel and guides. Basis of design: Apollo #120T-LF/120S-LF Lead Free Bronze, Apollo #711F-LF Lead Free Cast Iron, or equal.

C. Ball Valves:

1. Valves 2-inches and smaller shall be lead free cast bronze body, chrome-plated brass ball, teflon seats, and lever handle, 600 psi CWP. Valves shall comply with MSS SP-110, NSF/ANSI 61, NSF/ANSI 372 Lead Free. Valves over 2-inches shall be cast steel body, chrome plated steel ball, teflon seats, and lever handle. Victaulic, Anvil Gruvlok, Grinnell, or Shurjoint ball valves are acceptable if grooved piping is used. Valves mounted higher than 7'-0" A.F.F. shall be provided with chain, wheel, and guides. Basis of design: Apollo #77CLF-A Series or equal.

D. Butterfly Valve:

1. Valves 12-inches and smaller shall be ductile iron lug body, ASTM A-536, 316 stainless steel disc, EPDM Liner, 316 stainless steel stem, and safety twist-lock multi-position lever handle with open-closed lockout capabilities. Valve shall be rated at 175 psig WOG. Valves mounted higher than 7'-0" A.F.F. shall be provided with chain wheel and guides. Valves shall comply with MSS SP-67. Victaulic, Anvil Gruvlok, Grinnell, or Shurjoint butterfly valves are acceptable if grooved piping is used.

E. Check Valves:

1. Valves 2-inches and smaller shall be bronze body Y-pattern, ASTM B-62, swing check, bronze disc, 200 psi WOG. Valves shall comply with MSS SP-80, NSF/ANSI 61-8 F&G, NSF/ANSI 372 Lead Free. Valves, over 2-inches shall be iron body, ASTM A-126, bronze trim, swing check, renewable disc and seat. Valves shall comply with MSS SP-71. Victaulic, Anvil Gruvlok, Grinnell, or Shurlock check valves are acceptable if grooved piping is used. Basis of design: Apollo # 161T-LF/161S-LF Lead Free Bronze, Apollo # 920F-LF Lead Free Cast Iron, or equal.
2. Swing check valves with outside lever and spring (not center guided) is to be used on sewage ejector or storm-water sump pumps. Basis of design: Apollo # 910FLW-LF Lead Free Cast Iron or equal.

F. Pressure Reducing Valves:

1. Valves 2-inches and smaller shall be bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, and single union end. Basis of design: Apollo # 36ELF Series Lead Free Bronze or equal.

G. Balance Valve:

1. Valve shall have a twin tube 316 S.S. design with blowout proof attachment to station body. Ports shall include ¾" port for thermometer, ¼" port for pressure gauge, air vent, and ½" drain port.
2. The instrument station shall be 120/150-flanged construction.
3. The butterfly valve shall be lug pattern with a rating of 200 WP, 250 deg. F. The valve shall have an infinite. Position operator with memory stop (6" and smaller), worm gear with memory stop (8" and larger).

H. Y-Pattern Strainers:

1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 (DN 50) and smaller; flanged ends for NPS 2-1/2 (DN 65) and larger.
3. Strainer Screen: 40-mesh startup strainer and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig (862 kPa).

I. Install strainers on inlet side of each control valve, pressure-reducing valve, solenoid valve, inline pump, and elsewhere as indicated. Install NPS ¾ (DN 20) nipple and ball valve in blowdown connection of strainers NPS 2 (DN 50) and larger. Match size of strainer blow-off connection for strainers smaller than NPS (DN50).

PART 3 - EXECUTION

3.1 WORKMANSHIP:

A. General:

1. Install all piping, fixtures, equipment, and accessories as shown, and in strict accordance with the plumbing laws, rules, and regulations of the State and/or City. All work shall be done in a neat and orderly fashion and left in a condition satisfactory to the Architect/Engineer.

B. Piping:

1. All piping shall be run parallel or perpendicular to established building lines. Install piping so as to allow for expansion. Waste and vent piping occurring above floor slab shall be installed true and plumb. Extend vents at least 1 foot above roof, or to the top of the closest adjacent parapet wall, whichever is greater, and provide watertight flashing sleeves. Excavation and backfill shall be in accordance with Section 220000 of these specifications.

C. Fixtures:

1. Install fixtures true and plumb with building walls. Caulk all plumbing fixtures at joints along walls, countertops, and other intersecting surfaces. Locate fixtures as shown and per manufacturer's instructions. Furnish all required trim for fixtures to provide a complete and workable installation.

3.2 TESTS:

A. General:

1. All piping, fixtures, and equipment shall be inspected and approved before concealing or covering. All work shall be tested as required by Section 220000 of these specifications and shall be leak proof before inspection is requested. All tests shall be repeated if required by those making the inspection.
2. All potable water systems shall be flushed and disinfected in accordance with Section 220000 of these specifications. Following disinfection, system shall be flushed and water sampled to show compliance with requirements of public health authority having jurisdiction. If tested water does not meet requirements, disinfecting shall be repeated until water quality meets requirements.
3. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Gasket shall be molded and produced by Victaulic Company, Gruvlok, or Grinnell Mechanical Products, or equal. Verify gasket grade is suitable for the intended service. The grooved coupling manufacturer's factory trained representative shall provide on-site training for contractor's field personnel the use of grooving tools, application of groove, and installation of grooved end products.
    a. All grooved joint couplings, fittings, valves and specialties shall be the products of Victaulic Company, Gruvlok, Grinnell Mechanical Products, or equal.
4. Install the grooved piping in accordance with the latest recommendations as published by the manufacturer. Pipe shall be square cut, +/-0.30", properly deburred and cleaned. Mark pipe ends at the required location using a gauge supplied by the manufacturer to ensure full insertion into the coupling or fitting during assembly. Use a manufacturer's tool with the proper sized jaw for pressing.

B. Fixtures and Equipment:

1. Fill all plumbing fixtures with water and check for leaks or retarded flow. Repair as required. Adjust each piece of plumbing equipment as required to ensure proper functioning. Leave all fixtures and equipment in first class operating condition.
2. The Plumbing Contractor is responsible for all backflow devices to be inspected by a certified backflow technician before use of the building potable water system.

C. Smoke Test:

1. A smoke test shall be performed on the entire waste and vent system before building occupancy. After all fixtures are permanently connected and traps are filled with water, fill entire drainage systems with smoke under pressure of 1.3 pKa (1 inch of water) with a smoke machine. If leaks are detected, they shall be repaired and the smoke test shall be performed again until no leaks are found.

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PIPING SYSTEM TEST REPORT

STRUCTURE/BUILDING: _____ TEST NUMBER: _____

LOCATION: _____ CONTRACT NO._____

DESCRIPTION OF SYSTEM/PIPING BEING TESTED:

_____

_____

_____

Description of Test Performed	Test Pressure	Test Duration	Pass/Fail
Hydrostatic: _____	P.S.I.	_____	_____
Inert Gas: _____	P.S.I.	_____	_____
Compressed Air: _____	P.S.I.	_____	_____
Waste & Vent Smoke Test: _____	1" Water Column	_____	_____

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TEST'S FOR CONTRACTOR:

Name: _____ *Title:* _____

Signature: _____

I hereby certify that the above described system has been tested as indicated above and found to be entirely satisfactory as required in the contract specifications.

Signature of Inspector: _____ Date: _____

REMARKS: _____

_____

_____

_____

_____

END OF SECTION 220100

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING

SECTION 230000 - HVAC GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE:

A. General:

1. The Bidding Requirements, Contract Requirements, and the General Requirements (Division 1) of these specifications shall govern all parts of the work.

B. Work Included:

1. Install work in accordance with these specifications and the accompanying plans. Furnish all labor, material, and equipment together with all incidental items not specifically shown or specified which are required by good practice to provide the complete mechanical systems as described.
2. The HVAC Contractor(s) and all Sub-tier Contractors shall provide installed equipment cut sheets and purchase orders required for utility rebates.

C. Coordination and Site Visits:

1. This section of the work requires examination of and reference to all architectural, structural, utility, and electrical drawings for construction conditions that may affect the work. Inspect the building site and existing facilities for verification of existing conditions. Base all measurements from established benchmarks. Any discrepancy between actual measurements and those indicated, which prevents following good practices or the intent of the drawings and specifications, shall be reported to the Architect/Engineer, and work halted until instructions are received from the Architect/Engineer.

1.2 CODES, PERMITS, FEES:

A. Install all work in accordance with applicable codes and standards. Obtain all required permits; pay all required fees including utility connections or extensions, in connection with this portion of the construction. Obtain all required certificates of inspection for the work.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP:

A. Materials:

1. All materials and equipment shall be of first quality, new, full size and weight, standard in every respect, and suitable for the space required. Use the same manufacturer for products of similar class or service, such as valves, pumps, controls, and air handlers. Protect all materials against loss, theft, or damage before and after installation.
2. Furnish equipment that will operate under all conditions of load without any sound or vibration that is objectionable in the opinion of the Architect/Engineer. Vibration or

noise considered objectionable will be corrected by the Subcontractor at his expense.

3. Furnish and install all necessary foundations, supports, pads, bases, and piers required for all materials and equipment furnished under this contract.
4. Provide all required firestopping at duct penetrations of fire rated walls, floors, ceilings, and roofs. Firestopping shall be Dow Corning Fire Stop Sealant 2000 or Fire Stop Foam 2001, or approved equal.

B. Workmanship:

1. All materials and equipment shall be installed in a neat and workmanlike manner by competent specialists for each subtrade. Work shall be installed to the satisfaction of the Architect/Engineer with unsatisfactory work removed and reinstalled to his satisfaction at no extra cost to the Owner.
2. Provide all cutting and patching necessary to install the work specified in this section. Patching shall match adjacent surfaces. No structural members shall be cut without the approval of the Architect/Engineer. Provide sleeves at all piping penetrations of exterior walls and floors on grade. Provide all sleeves and inserts required before new floors and walls are built.
3. Locate all equipment that must be serviced in fully accessible positions. Provide clearance for removal of replacement parts and components, and with necessary couplings or flanges to remove the component for maintenance.

C. Protection of Equipment During Construction:

1. At the end of each shift, all duct openings and open ends shall be covered with a plastic poly sheeting film to protect against dust and construction contamination from entering the ductwork.

2.2 SUBMITTALS AND SUBSTITUTIONS:

A. Prebid Approval:

1. Manufacturer’s trade names and catalog numbers stated herein are intended to indicate the quality of equipment or materials desired. All manufacturers not specifically listed require prior approval. Submit catalog data, including specifications, of the proposed equipment to the Architect/Engineer for his approval at least 10 calendar days prior to bid opening. Notice of such approvals will be published in an addendum. Approval of listed alternate equipment manufacturers is for bidding only. Final approval is to be based on requirements of the plans and specifications.

B. Submittals:

1. Within thirty days after award of this contract, provide an electronic copy of a complete list of all materials and equipment proposed for this project. List shall contain make, type, manufacturer's name, and trade designation of all materials and equipment. Submittal shall also include manufacturer's complete specification for each item, including capacities, ratings, etc., and dimensions as required to check space requirements. The scheduled equipment is the basis of design for capacity, weights, physical size, etc. Alternate manufacturers shall not exceed the weight or physical size. Any changes to the Architectural, Structural, Mechanical, Electrical, and Control systems due to alternate manufactures shall be the responsibility of the Contractor and Supplier. Submittals for each major trade (i.e., dryside HVAC,

wetside HVAC, or Plumbing) shall be submitted in a single complete package. Individual items will not be reviewed independently unless approved by the Engineer.

2. Approval of submittals shall not relieve the contractor from responsibility for deviations from the plans or specifications, unless he has, in writing, called the Architect's /Engineer's attention to deviations at the time of submission, and obtained his written approval. Approval of submittals does not relieve the contractor from responsibility for errors in shop drawings or literature.

C. Equipment Requiring Submittals:

1. Makeup Air Units
2. Exhaust Fans
3. Electric Unit Heaters
4. Grilles / Diffusers
5. Pipe Stands
6. Flex Duct
7. Ductless Split Systems
8. Gas Unit Heaters
9. Vehicle Gas Detection System
10. Louvers
11. Electric Heaters

PART 3 - EXECUTION

3.1 ACCESSIBILITY & SAFETY:

A. Accessibility:

1. All equipment which must be serviced or operated shall be located in fully accessible position. Minor changes from the drawings may be made to allow for better accessibility. All changes shall be approved prior to actual installation.
2. Access panels shall be provided if required for accessibility. Access panels to be steel, flanged, hinged doors by Cendrex, or equal. Sized as required for installation. Subcontractor shall furnish the required panels to the General Contractor and the required location for all access panels, unless otherwise specified in the Architectural specifications. Panels shall be installed by the General Contractor.

B. Safety:

1. Subcontractor shall provide guards for all belt drives and rotating machinery.

3.2 COORDINATION:

A. Coordinate all work with the various trades involved to provide a complete and satisfactory installation. The exact details of ductwork and equipment are not shown. No additional compensation will be made for offsets or relocation required in coordination with other trades.

B. Alterations required due to improper supervision by the subcontractor shall be made at no extra cost, to the satisfaction of the Architect/Engineer.

3.3 ELECTRICAL:

A. Electric motors required for equipment specified in this section shall be provided and installed by this Subcontractor. Motor starters, disconnects, relays, pilot lights, etc., are in general, to be furnished and installed by the Electrical Contractor. Starters, relays, controls, etc., which are factory assembled into packaged equipment shall be furnished by the Mechanical Contractor under this section of the specifications.

B. All motors shall be provided with adequate starting and protective equipment as specified or required. Motor capacity shall be sufficient to operate driven device under all conditions of operation and load without overload. Minimum horsepower shall be as specified.

3.4 IDENTIFICATION AND CODING:

A. Painting:

1. All painting of mechanical equipment, accessories and ductwork shall be furnished and applied under the Architectural section of these specifications. All painting shall be completed before any identification markings are applied.

B. Equipment:

1. Identify all equipment with a black Formica label, with white reveal when engraved. Lettering to be 3/16 inch high minimum. In general, identify equipment as to area served in addition to title and code number of the equipment as taken from the plans.

C. Piping:

1. Identify all piping as to the service of the pipe and the direction of flow. The letters shall be 3/4 inch high on piping two inches or smaller, and 1-1/4 inches high on piping up to six inches. Flow arrows shall be at least six inches long. The letters and flow arrows shall be made by precut stencils and oil base paint, one inch high and black, or factory fabricated plastic pipe markers. Piping shall be identified at 25 foot maximum intervals, on long continuous lines; adjacent to each item of equipment; on each riser and junction, and on both sides of all wall penetrations. Underground piping shall be identified with bright colored continuously printed plastic tape of not less than 6" wide by 4 mil thick, manufactured for direct burial service. Install directly above all buried pipe, 6 to 8 inches below finished grade.

3.5 TESTING:

A. Systems:

1. All systems, including heating, ventilating and air conditioning, shall be tested at the completion of the building to establish that the systems operate as specified and required. Testing shall be performed after air balancing is completed.
2. All controls shall be calibrated accurately and all equipment shall be adjusted for satisfactory operation. Excessive vibration or noise from any system shall be corrected.
3. The air conditioning system shall be tested for satisfactory operation when the outside air temperature reaches 60 degrees F. or warmer. All other systems shall be tested at building completion. All tests shall be performed in the presence of the Architect/Engineer or his representative.

3.6 BALANCING:

A. Scope:

1. Prior to final acceptance by the Owners, all air systems shall be balanced to deliver the quantities as specified or directed. The air balance shall be performed by an independent agency specializing in balancing and is certified by the National Environmental Balancing Bureau.
2. All contractors must receive prior approval from the Engineer, in writing, before bidding the project.
3. The Mechanical Contractor shall provide assistance to the Balancing Contractor by identifying all installed mechanical systems and assisting access to all installed mechanical systems. All mechanical systems shall be completely operational and functional prior to the Balancing Contractor performing their specified work.

B. Air balancing:

1. Balancing of the air system shall consist of:
    a. Adjust all air volumes to the quantities shown, with allowable variation of plus 10, minus 10 percent.
    b. Record all system, zone, diffuser, grille, and register C.F.M. Use volume control devices to regulate air quantities only to the extent that adjustments do not create objectionable air motion or sound levels. Balancing Engineer shall work with the Contractor to set minimum & maximum CFM quantities for zone dampers, or zone dampers/heaters.
    c. Test and record all system static pressures, inlet and discharge, on all packaged units, fans, and terminal units. Vary total system air quantities by adjustment of fan speeds. Provide drive changes as necessary. Vary branch air quantities by damper regulation.
    d. Test and record motor full load amps and nameplate amps.
    e. Test and record entering and leaving temperatures at all coils.
    f. Adjust all automatically operated dampers, in cooperation with the Control Contractor, to the required settings. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions within specified tolerances. Where modulating dampers or economizers are provided, take measurements at full return air, minimum outside air, and 100 percent outside air mode of operation.
    g. Adjust diffusers and grilles for proper deflection, throw, and coverage. Eliminate drafts and excessive noise where possible.
    h. Mark final positions of all balance dampers with a red felt pen.
    i. Air systems shall be balanced in accordance with standard procedures and recognized practices of the Associated Air Balance Council, and the Testing Adjusting, and Balancing Bureau.

C. Quality Assurance:

1. Balancing Contractor shall demonstrate to the Engineer of record, flow verification for at least 10% of the balanced devices as selected by the Engineer. If more than 25% of the tested devices do not meet the designed or balance report, then the entire system balance must be rebalanced.

D. Balance Reports:

1. Submit four copies of the air system balance report to the Architect/Engineer for evaluation and approval. Reports shall be on TABB/SMACNA forms that indicate information addressing each of the testing methods, readings, and adjustments.

3.7 CLEANING AND ADJUSTING:

A. Thoroughly clean all air conditioning units, air handling units, and all associated parts of the system at the completion of the work. Install new, clean air filters in all systems. Adjust all devices for proper operation and lubricate all equipment as required. Repaint any painted surface that has been damaged.

3.8 PROJECT CLOSEOUT:

A. Operations & Maintenance Manual:

B. The Contractor shall provide an operations and maintenance manual at least thirty days prior to completion of work. The manual shall be of the three-ring binder type, entitled "Operations and Maintenance Manual", with the job name and year of completion also included. O & M manuals shall be submitted in a single package. In addition, the contractor shall provide two consolidated electronic versions on two separate thumb drives. Individual items will not be accepted independently unless approved by the Engineer. The manual shall include, as a minimum:

1. Maintenance instructions for all equipment, including lubrication requirements.
2. Equipment suppliers' names, addresses, and telephone numbers.
3. Equipment catalog cuts, ratings tables, model numbers, serial numbers, and accessories.
4. Parts numbers for all replaceable parts.
5. Air and/or water systems balance report as hereinbefore specified.
6. Control diagram or drawing and operation sequence.
7. Valve tagging chart as hereinbefore specified.
8. Filter chart listing unit callout, size of filters, and quantity of filters.
9. Guarantee letter as specified below.
10. Any additional information required to enable the Owner to properly maintain the building mechanical system.
11. Mechanical Equipment Start-up forms, which are included in this specification, if they are required.
12. After approval of the Operations and Maintenance Manual by the Architect/Engineer, the Contractor shall furnish two copies of the manual to the Owner.

C. Mechanical System Training Period:

1. After the mechanical system is completely installed and operational, the mechanical contractor shall provide a minimum of 4 hours training and instruction time for the building Owner or his representative. During this period, the contractor shall instruct the Owner in the operation and maintenance of all parts of the mechanical system, using the O & M manual where applicable. The contractor shall provide a copy of the Project Owner Mechanical Systems Training Form (attached to this specification), with proper signatures, to the Engineer prior to substantial completion and ensure that a copy is inserted into the project O & M manuals.

D. As-Built-Drawings:

1. Provide two sets of red-line mechanical drawings showing the work as it was actually installed. The drawings shall indicate all departures from the contract drawings. Make all notations neat and legible, with red indelible pencil. At the completion of the work, these as-built drawings shall be signed and dated by the Mechanical Contractor, and returned to the Architect/Engineer.

E. Guarantee:

1. All work furnished under this section shall be guaranteed in writing to be free from defective work or materials for a period of one year after acceptance of the contract. All repairs or replacements because of defective materials or workmanship or noncompliance with code shall be provided without additional cost to the Owner. Contractor shall furnish a letter indicating above guarantee with space for date of acceptance and expiration of guarantee. Letter shall be included in O & M Manual.

END OF SECTION

NAME OF PROJECT:_____

OWNER MECHANICAL SYSTEM TRAINING FORM

Upon completion of the equipment and systems installation and connections, the contractor shall assemble all required equipment factory representative and subcontractors together for system Owner training.

These people shall assist in Owner training their system(s) and remain at the site until the total system operations is acceptable and understood by the Owner's representative(s), maintenance and/or operation personnel, on operation and maintenance of their equipment. To prove acceptance of operation and instruction by the Owner's representative(s), the contractor shall provide a copy of this form, with proper signatures, to the Engineer prior to substantial completion, and ensure that a copy is inserted into the project Operation and Maintenance manuals.

"I, the Contractor, associated factory representative and subcontractors, have started each system and the total system(s); and have proven their normal operation to the Owner's representative(s) and maintenance/operation personnel and have instructed him/them _____, hours in the operation and maintenance thereof."

_____	_____
Owner's Representative	Contractor
_____	_____
Signature	Signature
_____	_____
Date	Date

SECTION 230100 - HEATING, VENTILATING, AND AIR CONDITIONING

PART 1 - GENERAL

1.1 SCOPE

A. This section covers the work necessary for the heating, ventilating, and air conditioning system, complete. The HVAC General Requirements, Section 230000, is to be included as a part of this section of the specifications.

1.2 CODES & STANDARDS

A. The heating, ventilating, and air conditioning system shall be installed in accordance with the latest edition of the following codes and standards:

1. International Mechanical Code (IMC)
2. International Building Code (IBC)
3. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
4. National Fire Protection Association (NFPA)
5. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)

PART 2 - PRODUCTS

2.1 MAKEUP AIR UNITS

A. Direct Fired Heating Unit:

1. Description:
   a. This section includes units with integral Direct Gas-Fired heatingAirflow arrangement shall be Outdoor Air with Variable Air Volume. Each unit shall be constructed in a horizontal configuration and shall incorporate additional product requirements as listed in Section 2 of this specification.

2. Cabinet:
   a. Materials: Formed, double wall insulated metal cabinet, fabricated to permit access to internal components for maintenance. Outside casing: 18 gauge, galvanized (G90) steel meeting ASTM A653 for components that do not receive a painted finish. Pre-painted components as supplied by the factory shall have polyester urethane paint on 18 gauge G60 galvanized steel. Base rail is 12 gauge, galvazined (G90) steel. Internal Assemblies: 24 gauge galvanized (G90) steel except for motor supports which shall be minimum 14 gauge galvanized (G90) steel.
   b. Cabinet Insulation: Comply with NFPA 90A and NFPA 90B and erosion requirements of UL 181. Materials: Fiberglass insulation. If insulation other than fiberglass is used, it must also meet the Fire Hazard Classification shown here: 1” thickness, Maximum flame spread of 25 and smoke developed of 50, when tested in accordance with ASTM C 411, Floor of each unit shall be insulated with fiberglass insulation. Full interior coverage of entire cabinet to include walls and roof of unit shall be semi-rigid type and installed between inner and outer shells of all cabinet exterior components when double walls are specified, Unit shall be equipped with insulated hinged access

panels to provide easy access to all major components. Access panels shall be fabricated of 18 gauge galvanized G90 steel, Direct-drive fan(s): Blower assembly shall consist of an electric motor as specified by A/E. Assembly shall be mounted on heavy gauge galvanized steel rails and further mounted on minimum 1.125 inch thick neoprene vibration isolators. Blower motor(s) shall be capable of continuous speed modulation and controlled by a factory supplied VFD.

3. Control Center / Connections:
   a. Unit shall have an electrical control center where all high and low voltage connections are made. Control center shall be constructed to permit single-point high voltage power supply connections.

4. Furnace:
   a. Unit shall be factory assembled, piped, and wired. Direct gas-fired system will be 92% efficient while supplying a burner that is capable of providing 25:1 turndown. Unit will utilize a draw through design and incorporate adjustable burner baffles plates for field adjustments. Unit will have a EconomyPilot ignition system.
   b. Burner construction shall consist of a cast aluminum burner manifold and 400 series stainless steel mixing plates. No air from inside the space shall be allowed to pass across the burner at any time. Flame sensing shall be provided by a flame rod. Burner control shall have a digital coded fault indicator capable of storing the last five faults.
   c. Shall be equipped for operation on LP gas with a maximum rated inlet gas pressure of 1/2 PSI.
   d. Burner control option to include the following: Discharge temperature.
   e. Shall include: Manual Reset, High Limit Switch: Main gas valve closes if high-limit temperature is exceeded, Dual safety shutoff valves shall be provided that do not exceed 120 VAC control signals, & Includes high and low gas pressure switches and visual indication gas valves.

5. Motorized Air Inlet Dampers:
   a. To be of low leakage type and shall be factory installed.

6. Manufacturer, Capacity & Accessories:
   a. See Drawings

2.2 EXHAUST FANS

A. Ceiling Cabinet Exhaust Fan:

1. Description:
   a. Fan shall be ceiling, wall, or inline mounted, direct driven, centrifugal exhaust fan.

2. Certifications:
   a. Fan shall be listed by Underwriters Laboratories (UL 705) and UL listed for Canada (cUL 705). Fan shall bear the AMCA certified ratings seal for sound and air performance.

3. Construction:
   a. The fan housing shall be minimum 20 gauge galvanized steel and acoustically insulated housing above 200 cfm. Blower and motor assembly shall be mounted to

a minimum 14 gauge reinforcing channel and shall be easily removable from the housing. Motor shall be mounted on vibration isolators. Unit shall be supplied with integral wiring box and disconnect receptacle shall be standard. Discharge position shall be convertible from right angle to straight through by moving interchangeable panels. The outlet duct collar shall include a reinforced aluminum damper with continuous aluminum hinge rod and brass bushings. To accommodate different ceiling thickness, an adjustable prepunched mounting bracket shall be provided. A powder painted white steel grille shall be provided as standard.

4. Wheel:
   a. Wheel shall be centrifugal forward curved type, constructed of galvanized steel. Wheel shall be balanced in accordance with AMCA Standard.

5. Motor:
   a. Motor shall be open drip proof type with permanently lubricated sealed bearings, built-in thermal overload protection and disconnect plug. Motor shall be furnished at the specified voltage.

7. Manufacturer, Capacity & Accessories:

   a. See Drawings

B. Upblast Rooftop Exhaust Fan:

1. Description:
   a. Fan shall be a spun aluminum, roof mounted, direct driven, upblast centrifugal exhaust ventilator.

2. Certifications:
   a. Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 705) and UL listed for Canada (cUL 705). Fan shall bear the AMCA certified ratings seal for sound and air performance.

3. Construction:
   a. Fan shall be of bolted and welded construction utilizing corrosion resistant fasteners. The spun aluminum structural components shall be constructed of minimum 16 gauge marine alloy aluminum, bolted to a rigid aluminum support structure. The aluminum base shall have a one piece inlet spinning and continuously welded curb cap corners for maximum leak protection. The windband shall have a rolled bead for added strength. An integral conduit chase shall be provided into the motor compartment to facilitate wiring connections. The motor shall be enclosed in a weather-tight compartment, separated from the exhaust airstream. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM and static pressure. Unit shall be shipped in ISTA certified transit tested packaging.

4. Wheel:
   a. Wheel shall be centrifugal backward inclined, constructed of 100% aluminum, including a precision machined cast aluminum hub. An aerodynamic aluminum inlet cone shall be provided for maximum performance and efficiency. Wheel shall be balanced in accordance with AMCA Standard 204-05, *Balance Quality and Vibration*

Levels for Fans.

5. Motor:
   a. Motor shall be NEMA design B with a minimum of class B insulation rated for continuous duty and furnished at the specified voltage, phase and enclosure.

6. Manufacturer, Capacity & Accessories:
   a. See Drawings

2.3 UNIT HEATERS.

A. Gas Fired Unit Heater (Separated Combustion):

1. Heat Exchanger:

   a. The heater shall be equipped with a multicell, 4 pass serpentine style steel heat exchanger. Heat exchanger tubes shall be press fabricated of (titanium stabilized, corrosion resistant aluminized steel). All heat exchangers shall be fabricated with no welding or brazing, only tool pressed mechanical joints. All heat exchanger cells shall be designed with an aerodynamic cross section to provide maximum airflow.

2. Burner:

   a. The units shall incorporate a single, one piece burner assembly with a single orifice. The burner shall have a continuous wound close pressed stainless steel ribbon separating the flame from the burner interior. All units shall have a single venturi tube and orifice supplying fuel to a one-piece burner housing. Each heat exchanger cell shall use balanced draft induction to maintain optimum flame control.

3. Controls:

   a. Controls shall include a (single-stage) (two-stage) gas valve; direct spark multi-try ignition with electronic flame supervision with 100% lockout integrally controlled via a printed circuit control board. The control board shall also incorporate diagnostic lights, DIP switches for fan overrun settings, and a relay for fan only operation. All units shall be equipped with a safety limit switch.

   b. All controls shall be enclosed in the sealed control compartment to protect them from accidental damage, dust, and atmospheric corrosion.

4. Combustion Air and Venting:

   a. The unit shall have a factory-installed power venter device to draw combustion air from outside of the building. The outside air shall enter the unit through a factory-installed round inlet air terminal on the rear of the heater. The control compartment shall be sealed and the access door shall be gasketed to prevent dirt, lint, dust, or other contaminants present in the heater space from entering the unit. The control compartment door shall be equipped with a safety interlock switch to prevent operation when the door is open.

   b. The combustion air supply pipe and flue exhaust pipe shall be run in parallel from the heater to a factory supplied concentric adapter assembly, which allows for a single wall or roof penetration, to the (horizontal) (vertical) air inlet and vent terminal.

   c. The combustion air/venting system shall include a vibration isolated power venter motor and wheel assembly and a combustion air pressure switch. Unit shall include a flame rollout switch.

5. Electrical:

    a. Operation shall be controlled by an integrated circuit board that includes LED diagnostic indicator lights. Supply voltage connections are made be made in a sealed junction box. 24-volt control connections shall be made on an externally mounted terminal strip. All internal wiring, both line and control voltages, shall be terminated by insulated terminal connectors to minimize shock hazard during service.

    b. All units will be equipped with a built-in disconnect switch.

6. Cabinet:

    a. The cabinet shall have pre-coat or powdercoat white paint finish. The cabinet shall be constructed so that screws are not visible from the bottom, front, or sides, except for service panel and accessories. All units shall be manufactured with a tooled drawn supply air orifice on the rear panel to reduce fan inlet noise.

    b. The unit shall be designed for ceiling suspension at both 2-point and 4-point locations with no additional adapter kits.

    c. The cabinet shall be equipped with painted, roll-formed horizontal louvers. Louvers shall be spring held and adjustable for directing airflow.

    d. The cabinet shall be equipped with a full safety fan guard. The motor and fan assembly shall be resiliently mounted to the cabinet to reduce vibration and noise.

    e. The unit shall be designed with a full opening service access panel complete with screw closure attachment and lifting handle for removal. Service panel shall be fully gasketed and equipped with a safety interlock switch. All components in the gas train, all standard electrical controls, and the power venter shall be within the sealed service compartment.

7. Certifications:

    a. Units shall be certified to CSA International Requirement 10-96 U.S. for RESIDENTIAL INSTALLATION. All sizes shall be design certified by the Canadian Standards Association to ANSI Z83.8b and CSA 2.6b for commercial/industrial installation.

8. Manufacturer, Capacity & Accessories:

    a. See Drawings

B. Electric Unit Heaters

    1. See plans for requirements.:

2.4 DUCTLESS SPLIT SYSTEMS

A. Ductless Split System - Wall-Mounted Units
¾ to 3 ton nominal cooling only or heat pump outdoor unit

    1. General:

        a. Indoor, direct-expansion, wall-mounted fan coil. Unit shall be complete with cooling/heating coil, fan, fan motor, piping connectors, electrical controls, microprocessor control system, and integral temperature sensing. Unit shall be furnished with integral wall mounting bracket and mounting hardware. Unit shall be rated per ARI Standards 210/240 and UL labeled.

2. Unit Cabinet:
    a. Cabinet discharge and inlet grilles shall be attractively styled, high-impact polystyrene. Cabinet shall be fully insulated for improved thermal and acoustic performance.

3. Fans:
    a. Fan shall be tangential direct-drive blower type with air intake at the top of the unit and discharge at the bottom front. Automatic, motor-driven vertical air sweep shall be provided standard.
    b. Air sweep operation shall be user selectable. The vertical sweep may be adjusted (using the remote control) and the horizontal air direction may be set manually.

4. Coil:
    a. Coil shall be copper tube with aluminum fins and galvanized steel tube sheets. Fins shall be bonded to the tubes by mechanical expansion. A drip pan under the coil shall have a drain connection for hose attachment to remove condensate. Condensate pan shall have internal trap.

5. Motors:
    a. Motors shall be open drip-proof, permanently lubricated ball bearing with inherent overload protection. Fan motors shall be 3-speed.

6. Controls:
    a. Controls shall consist of a microprocessor-based control system which shall control space temperature, determine optimum fan speed, and run self-diagnostics. The temperature control range shall be from 62° F to 84° F.
    b. The unit shall have the following functions as a minimum:
        1) An automatic restart after power failure at the same operating conditions as at failure.
        2) A timer function, to provide a minimum 24-hour timer cycle for system Auto Start/Stop.
        3) Temperature-sensing controls shall sense return air temperature.
        4) Indoor coil freeze protection.
        5) Wireless infrared remote control to enter set points and operating conditions.
        6) Automatic air sweep control to provide on or off activation of air sweep louvers.
        7) Dehumidification mode shall provide increased latent removal capability by modulating system operation and set point temperature.
        8) Fan-only operation to provide room air circulation when no cooling is required.
        9) Diagnostics shall provide continuous checks of unit operation and warn of possible malfunctions. Error messages shall be displayed at the unit.
        10) Fan speed control shall be user-selectable: high, medium, low, or microprocessor controlled automatic operation during all operating modes.
        11) Automatic heating-to-cooling changeover in heat pump mode. Control shall include deadband to prevent rapid mode cycling between heating

and cooling.

12) Indoor coil high temperature protection shall be provided to detect excessive indoor discharge temperature when unit is in heat pump mode.
13) Control of auxiliary heat relay.

7. Filters:
    a. Unit shall have filter track with factory-supplied cleanable filters.

8. Electrical Requirements:
    a. Power is supplied from outdoor unit.

9. Special Features (Field Installed, if necessary):
    a. Condensate Pump: The condensate pump shall remove condensate from the drain pan when gravity drainage cannot be used. Pump shall be designed for quiet operation. Pump shall consist of two parts; an internal reservoir/sensor assembly, and a remote sound-shielded pump assembly. A liquid level sensor in the reservoir shall stop cooling operation if the liquid level in the reservoir is unacceptable.

10. Warranty:
    a. Minimum 1-year parts limited warranty.

B. Ductless Split System - Outdoor Units
¾ to 3 Ton Nominal Cooling Capacity / ¾ to 3 Ton Nominal Heating Capacity

1. Outdoor Units:
    a. General:
        1) Factory assembled, single piece, air-cooled outdoor unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and the compressor.
        2) Units shall consist of a rotary compressor, an air-cooled coil, propeller-type draw-through outdoor fan, reversing valve (HP), accumulator (HP units), metering device(s), and control box. Units shall discharge air horizontally as shown on the contract drawings. Units shall function as the outdoor component of an air-to-air cooling only, or heat pump system.
        3) Units shall be used in a refrigeration circuit matched to duct-free cooling only or heat pump fan coil units.
    b. Unit Cabinet:
        1) Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a baked-enamel finish on inside and outside.
        2) Unit access panels shall be removable with minimal screws and shall provide full access to the compressor, fan, and control components.
        3) Outdoor compartment shall be isolated and have an acoustic lining to assure quiet operation.
    c. Fans:
        1) Outdoor fans shall be direct-drive propeller type, and shall discharge air horizontally. Fans shall draw air through the outdoor coil.

2) Outdoor fan motors shall be totally-enclosed, single phase motors with class B insulation and permanently-lubricated ball bearings. Motor shall be protected by internal thermal overload protection.
3) Shaft shall have inherent corrosion resistance.
4) Fan blades shall be non-metallic and shall be statically and dynamically balanced.
5) Outdoor fan openings shall be equipped with PVC metal/mesh coated protection grille over fan.

d. Compressor:
1) Compressor shall be fully hermetic rotary type.
2) Compressor shall be equipped with oil system, operating oil charge, and motor. Internal overloads shall protect the compressor from over-temperature and over-current.
3) Motor shall be NEMA rated class F, suitable for operation in a refrigerant atmosphere.
4) Compressor assembly shall be installed on rubber vibration isolators.
5) Outdoor Coil:
6) Coil shall be constructed of aluminum fins mechanically bonded to seamless copper tubes, which are cleaned, dehydrated, and sealed.
7) Refrigeration Components:
8) Refrigerant circuit components shall include brass external liquid line service valve with service gage port connections, suction line service valve with service gage connection port, service gage port connections on compressor suction and discharge lines with Schrader type fittings with brass caps, accumulator, reversing valve. Provide tamper proof port caps. fan.

e. Controls and Safeties:
1) Operating controls and safeties shall be factory selected, assembled, and tested. The minimum control functions shall include the following:
a) A time delay control sequence is provided standard through the fan coil board.
b) Automatic outdoor-fan motor protection.
c) System diagnostics.
d) Compressor motor current and temperature overload protection.
e) Outdoor fan failure protection.

f. Electrical Requirements:
1) Unit electrical power shall be a single point connection.
2) Unit control voltage to the indoor-fan coil shall be 24 VDC.
3) All power and control siring must be installed per NEC and all local electrical codes.
4) Unit shall have high-and low-voltage terminal block connections.

g. Special Features (Field Installed):
1) Low-Ambient Kit: Control shall regulate fan-motor cycles in response to saturated condensing temperature of the unit. The control shall be capable of maintaining a condensing temperature of 100° F ± 10° F, with outdoor temperatures to 20° F. Installation of kit shall not require changing the outdoor fan motor.

h. Warranty:

1) 1-Year parts and 5-Year compressor warranty.

2.5 AIR DISTRIBUTION

A. Ductwork:

1. Low pressure ductwork shall be fabricated from galvanized sheet metal, unless otherwise indicated. Construction requirements shall be in accordance with SMACNA - HVAC Duct Construction Standards, metal and flexible, latest edition. All sheet metal ductwork shall be sealed with McGill United Sheet Duct Sealer or equal, in accordance with the International Energy Compliance Code, latest edition. Adjustable (twist) elbows are not allowed. Low pressure ductwork shall be constructed to the following SMACNA static pressure standards:
    a. Supply air ductwork = 2" W.G.
    b. Return, Exhaust, Outside Air Intake ductwork = 1" W.G.

2. Low pressure ductwork located exposed in exposed ceiling areas, shall be spiral type ducts with a “paint-grip” finish, on ductwork and associated fittings that can be painted. Joints shall be sealed evenly and in a professional manner with silver silicon. Discolored or damaged ductwork unacceptable to the Engineer shall be replaced at the Contractors expenses.
    a. Joints: 0” to 20” diameter, interior slip coupling beaded at center, fastened to duct with screws and with sealing compound applied continuously around joint before assembling and after fastening. Sealing compound shall be applied in an evenly and professional manner.
    b. Joints 22” – 72” diameter, use 3-piece, gasketed, flanged joints consisting of 2 internal flanges (with integral mastic sealant) split to accommodate minor differences in duct diameter, and one external closure band designed to compress gasketing between internal flanges. Manufacturer shall be Ductmate Spiralmate or equal.
    c. All takeoff or branch entrances shall be by means of factory-fabricated fittings. Field taps shall not be allowed.

3. Low pressure ductwork which is exposed or located in mechanical rooms shall be fabricated from galvanized sheet metal. Construction requirements shall be in accordance with SMACNA HVAC Duct Construction Standards, metal and flexible, latest edition.
4. Medium pressure ductwork shall be single wall, galvanized steel, spiral or oval duct as shown on the drawings. Ductwork shall be McGill Uni-Seal, Metaltec, or equal. Medium pressure ductwork shall be constructed to the following SMACNA static pressure standards:
    a. Supply air ductwork from air handler to the terminal unit = 4” W.G.
    b. All medium pressure ductwork shall be leak tested. Duct leakage test criteria shall be limited as follows:
    c. All supply ductwork from air handler to terminal unit: 1% of design cfm at 4” of static pressure.
    d. Duct leakage testing:
    1) Perform testing in accordance with the HVAC Air Duct Leakage Test Manual and SMACNA.
    2) Use a certified orifice tube for measuring the leakage.

3) Define section of system to be tested and blank off.
4) Determine the percentage of the system being tested.
5) Using that percentage, determine the allowable leakage 9 (cfm) for that section being tested.
6) Pressurize to operating pressure and repair any significant or audible leaks.
7) Re-pressurize and measure leakage.
8) Repeat steps 6 and 7 until leakage measured is less than the allowable in step 5.

5. Low or medium pressure, double wall acoustically insulated ductwork shall have a minimum 1” insulation, & perforated metal lining, & shall be McGill Acousti-k27, Metaltec, or equal.
6. Ductwork penetrating protective elements of fire-rated corridor walls, with no openings into corridor, shall be constructed of minimum 26 gauge galvanized steel.
7. Ductwork where humidifier grid is located shall be constructed of a minimum 304 stainless steel ductwork 18” prior to the grid and 24” after the grid. No interior liner shall be installed at the locations noted. The exterior of the duct shall be wrapped per the specifications as noted to meet energy code.
8. Exterior exposed ductwork shall be fabricated from galvanized sheets. All joints and seams shall be standing-seam type with sealing mastic to provide watertight construction. All ductwork shall be internally insulated as hereinafter specified. All exposed surfaces shall be primed and painted two coats of exterior enamel paint, color as selected by the Architect.
9. Flexible ducts shall be listed per UL-181 standard as Class 1 flexible, acoustical insulated air duct and complying with NFPA Standards 90A and 90B. Ducts shall be insulated with a minimum R-6 value, and shall have a maximum vapor transmission value of .05 perms. Ducts shall be factory made with and composed of: a PE liner duct permanently bonded to a coated spring steel wire helix. Duct shall be chlorine free and carry a ten-year warranty for the labor to replace the duct should there be a factory defect. Low permeability outer vapor barrier of fiberglass bidirectional reinforced metalized laminate shall complete the composite. Pressure rating shall be 6" w.g. and maximum length shall be 6 feet. Attach to duct take-off, diffuser, register, or grille only, with nylon or stainless steel duct clamp or tie. Flexmaster 1-M, or approved equal.

B. Duct Accessories:

1. Turning vanes shall be installed in all rectangular or square elbows. Vanes shall be installed in vane side rails. Vanes shall be single wall vanes, and be fabricated and installed per SMACNA standards.
2. Volume dampers shall be fabricated from galvanized steel in accordance with SMACNA standards. Dampers shall have a continuous galvanized steel shaft on ducts 13” diameter or larger, with damper regulators and end bearings. Dampers located above inaccessible ceilings (hard ceilings) shall be furnished with concealed ceiling damper regulators. Dampers shall be pressure rated equal to the design duct pressure rating. Dampers shall be provided at all diffuser and supply/exhaust grille takeoffs, regardless if indicated on the plans. Dampers are not required on the return air takeoffs unless specifically indicated.
3. Flexible connections shall be provided at all rotating fan equipment. Connectors shall be of fire, water, and weather resistant material.
4. Fire dampers shall be UL-labeled with frame, locking assembly, accordion style

folded blades, and fusible link. Dampers shall be Style B with blades stored outside of the air stream. Provide duct inspection door at each fire damper. Minimum size shall be 8" x 8". Inspection door shall be provided with a steel frame with gasketing around periphery, and a hinged panel. Dampers located in moisture laden air conditions shall have all metal parts made of stainless steel.

5. Combination smoke and fire dampers are to be fusible link type with factory sleeve and electric operator located exterior to duct 120 V. operator to be spring return, fail closed with 212 degrees F link and UL label. Provide duct inspection door at each damper. Minimum size shall be 8" x 8". Inspection door shall be provided with a steel frame with gasketing around periphery, and a hinged panel. Dampers located in moisture laden air conditions shall have all metal parts made of stainless steel. Belimo operators/actuators only.
6. Smoke dampers are to be ultra-low leakage (less than 4CFM/ft^2) type with factory sleeve and electric operator located exterior to duct 120 V. operator to be spring return, fail closed and UL label. Provide duct inspection door at each damper. Minimum size shall be 8" x 8". Inspection door shall be provided with a steel frame with gasketing around periphery, and a hinged panel. Dampers located in moisture laden air conditions shall have all metal parts made of stainless steel. Belimo operators/actuators only.
7. A plastic flex elbow support by Flexible Technologies Inc., Titus FlexRight, or approved equal, is required at all flex duct elbows supplying ceiling diffusers & return grilles. Elbow support shall be fully adjustable, or be of universal design, to support flexible diameters 6” – 16”, sized to fit flex duct. Elbow supports shall be UL rated for use in return air plenum spaces. At the Contractor’s option, a hard elbow may be used in lieu of a flexible elbow.

C. Diffusers, Registers, Louvers, Grilles, Weathercaps:

1. See Drawings for requirement.

D. Duct Cleanliness:

1. Ductwork Delivery To Site

    a. During ductwork being delivered from the premises of the manufacturer, care must be taken to prevent damage during transportation and off-loading.

2. Temporary Storage

    a. Job site duct material storage areas should be clean, dry, and located away from high dust generating processes such as masonry or tile cutters, cutoff saws, drywall sanding, mortar and plaster mixers, roof pitch kettles, portable electric generators, and main walkways that will be constantly broom swept. The general contractor should designate a suitable area for temporary storage.
    b. To prevent ductwork material damage from standing water, storage locations should include pallets or blocking to keep fabricated metal ductwork above the floor surface. If there is a risk of water runoff from above or dusty areas cannot be avoided, coverage should be used to protect stored materials.

3. Installation

    a. Before the installation of individual duct sections, they are to be inspected to

ensure that they are free from all debris.

b. All ductwork risers must be covered to prevent the entry of debris into the duct.
c. Downward facing and horizontal ductwork openings will not be required to be covered.
d. Access covers shall be firmly fitted in position on completion of each section of the work. Open ends on completed ductwork and overnight work-in-progress shall be sealed.
e. The working area should be clean and dry and protected from the elements.
f. The internal surfaces of the uninsulated ductwork shall be wiped to remove excess dust immediately prior to installation.

4. Advanced Cleanliness- For Hospitals, Laboratories, & Cleanrooms

a. In addition to the provisions previously described, the following requirements should also be undertaken:

1) All self-adhesive labels for part identification are to be applied to external surfaces only.
2) To maintain cleanliness during transportation, all ductwork shall be sealed either by blanking or capping duct ends, bagging small fittings, surface wrapping or shrink wrapping.
3) All sealed ends shall be visually examined and if damaged resealed with an appropriate material.
4) The working area shall be clean, dry and the ductwork protected from dust. Protective coverings shall only be removed immediately before installation and inspected to determine if additional wipe down is necessary.

2.6 PIPING SYSTEMS

A. Refrigerant Piping:

1. Refrigerant piping shall be manufacturer's standard line sets, in lengths as required for proper installation. Coiling of excess tubing will not be acceptable.
2. Provide factory wall outlet Airex Titan Outlet by Airex Manufacturing Inc. or equal. Wall outlet shall be provided with compression gasket and seal and fastened with non-corrosive screws with pre-loaded neoprene washers. Wall outlet shall be provided with an integrated over-molded flexible elastomeric sleeve for sealing, isolating and supporting refrigerant pipes from vibration. The wall outlet must provide for expansion and contraction wall protection features with gaskets and seals. A stainless-steel clamp must be provided and installed to provide a watertight seal.

B. Condensate Drain Piping:

1. Exterior to building, or located in plenum: Piping shall be Type L hard drawn copper, ASTM B88 with solder joints. Copper piping shall not be used on 90% condensing type equipment.
2. Interior: Piping shall by Type L hard drawn copper, ASTM B88, with solder joints, grade 95TA, or shall be Schedule 40 PVC. Copper piping shall not be used on 90% condensing type equipment.

C. Pipe Hangers and Supports:

1. See Section 220100 for hanger and support requirements for piping systems. See drawings for seismic support requirements for piping systems.

D. Piping Accessories:

1. Piping Hydronic Thermometer: Thermometer shall be 3" bimetal dial thermometers with recalibrator with a 0°F to 250°F range and 2°F scale and accurate within 1% of scale range. Thermometer shall be provided with an Vari-angle Form angle stem and thermowell. Thermometers shall be installed in the hydronic system in a neat workman like manner, aligned vertically and horizontally with other thermometers in the system. The thermometers shall be installed no higher than 9'-0" above finish floor and be readable from finish floor. Weiss instrument or approved equal.
2. Piping Hydronic Pressure Gauges: Pressure gauges shall be 4½" diameter, liquid filled gauges with ranges to meet 1.5 times the pressure ratings of the system its serving. Pressure gauges shall be provided with quarter turn ball valve isolation valves on the source side and on the bleed off line. Pressure gauges shall be installed in the hydronic system in a neat workman like manner, aligned vertically and horizontally with other pressure gauges in the system. The pressure sensors shall be installed no higher than 9'-0" above finish floor and be readable from finish floor. Weiss instrument or approved equal.
3. Air Vent: Non-modulating, high capacity, automatic type designed to purge free air from the system and provide positive shutoff at pressures up to 150 psig at a maximum temperature of 250°F. Vent shall be constructed of cast iron body and bonnet with stainless steel, brass, EPDM, and silicon rubber internal components.

E. Valves:

1. See Section 220100 for valve requirements.

F. Grooved Piping Requirements:

1. Grooved Pipe Valves:
    a. Butterfly Valves – 2" through 12" Sizes: 300 psi CWP suitable for bidirectional and dead-end service at full rated pressure. Body shall be grooved end black enamel coated ductile iron conforming to ASTM A536. Disc shall be electroless nickel plated ductile iron with blowout proof 416 stainless steel stem. Disc shall be offset from the stem centerline to allow full 360 degree circumferential seating. Seat shall be pressure responsive EPDM. Basis of design: Victaulic Vic®-300 MasterSeal™ or approved equal.
    b. Check Valves – 2" through 3" Sizes Spring Assisted: Black enamel coated ductile iron body, ASTM A-536, Grade 65-45-12, stainless steel non-slam tilting disc, stainless steel spring and brass shaft, nickel-plated seat surface, 365 psi. Victaulic Series 716H / 779 or approved equal.
    c. General Duty Valves – Tri-Service Valve Assembly: Combination shut-off, throttling and non-slam check valve.
    1) 2-1/2" through 12" Sizes: Butterfly valve with memory stop feature assembled with spring assisted, non-slam check valve. Check valve may include venture-like taps for flow measurement. Working pressures to 300 psi. Basis of design: Victaulic Series 761 butterfly valve in combination with Victaulic series 716 or 779 Check valve or approved equal.

2. Grooved Pipe Specialties:

   a. Strainers – Grooved-End

1) T-Type Strainer: 2” through 12” sizes, 300 PSI T-Type Strainer shall consist of ductile iron (ASTM A-536, Grade 65-14-12) body, Type 304 stainless steel frame and mesh removable basket with No. 12 mesh, 2”-3” strainer sizes, or No. 6 mesh, 4”-12” strainer sizes, 57% free open area. Basis of design: Victaulic Style 730 / W730 or approved equal.
2) Y-Type Strainer, 2” through 18” sizes, 300 PSI, Y-Type Strainer shall consist of ductile iron body, ASTM A-536, Grade 65-45-12, Type 304 stainless steel perforated metal removable baskets with 1/16” (1,6mm) diameter perforations 2”-3” strainer sizes, 1/8” (3.2mm) diameter perforations 4”-12” strainer sizes, and 0.156” (4mm) diameter perforations 14”-18” basis of design strainer sizes. Basis of design: Victaulic Style 732 / W732 or approved equal.

   b. Suction Diffuser – Flanged outlet with grooved inlet connections, rated to 300 psi. Ductile iron (ASTM A-536) body, 304 stainless steel frame and perforated sheet diffuser with 5/32” (4,0mm) diameter holes. Removable 20 mesh 304 stainless steel start-up pre-filter, outlets for pressure/temperature drain connections, and base support boss. Basis of design: Victaulic Series 731-G and W731-G or approved equal.

3. Quality Assurance

   a. To assure uniformity and compatibility of piping components in grooved end piping systems, all grooved products utilized shall be supplied by one manufacturer. Grooving tools shall be supplied by the same manufacturer as the grooved components.

4. Execution:

   a. Installation:

1) Pipe ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove for proper gasket sealing.
2) The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified.

   b. Couplings installation shall be complete when visual metal-to-metal contact is reached.
   c. Training:

1) A factory trained representative (direct employee) of the grooved product manufacturing company shall provide on-site training for contractor’s field personnel in the use of grooving tools, application of groove, and product installation.

   d. Application:

1) A representative of the grooved system supplier shall periodically visit the job site and review installation. Contractor shall fix and/or replace any improperly installed products.
2) Grooved mechanical pipe couplings, fittings, valves and other grooved

components may be used as an option to welding, threading or flanged methods.

3) All grooved components shall conform to local code approval and/or as listed by ANSI-B-31.1, B-31.3, B-31.9, ASME, UL/ULC, FM, IAPMO or BOCA.
4) Grooved end product manufacturer to be ISO-9001 certified.

2.7 INSULATION

A. General:

1. All insulation shall have composite fire and smoke hazard ratings, as tested by ASTM E-84, NFPA 255, and UL 723, not exceeding:

    a. Flame Spread 25
    b. Smoke Developed 50

B. Ductwork - External Insulation:

1. Insulation shall be fiberglass insulation with aluminum foil scrim kraft facing. All joints shall be taped with UL listed tape to provide a continuous vapor barrier. The following ducts shall be externally insulated:

    a. Supply ducts in unconditioned spaces (unless internally insulated)
    b. Return ducts in unconditioned spaces (unless internally insulated)
    c. Combustion air ducts
    d. Outside air intake ducts
    e. Exposed ductwork located within conditioned spaces shall not be externally insulated

2. Insulation thickness & "R" values shall be as follows:

    a. R-6 – ducts located in unconditioned spaces (such as above ceiling, but below roof insulation) and outside air intake ducts.
    b. R-12 – ducts located outside of the building's insulation envelope (such as above the attic insulation).

C. Ductwork - Internal Insulation:

1. Insulation shall be flexible fiberglass duct liner. Liner shall be attached with 100% coverage of manufacturers recommended adhesive and welded or mechanically fastened galvanized steel pins. All exposed edges of liner shall be coated with adhesive. Duct dimensions shown are net air side face-to-face of duct liner. The following ducts shall be internally insulated:

    a. Supply and Return ducts within 15'-0" of air handler
    b. Supply and Return ducts in mechanical rooms
    c. 15’-0” downstream of VAV terminal units.
    d. 15’-0” downstream of fan coil units.
    e. Exterior ducts (located outdoors)
    f. Buried ductwork below concrete slab
    g. Ducts as indicated on plans

2. Insulation thickness & "R" values shall be as follows:
    a. R-6 – ducts located in unconditioned spaces (such as above ceiling, but below roof insulation, or buried ductwork) and outside air ducts located outside of the building envelope.
    b. R-12 – ducts located outside of the building's insulation envelope (such as above the roof).

D. Piping Insulation - Refrigerant Piping:

1. Insulation on refrigerant suction piping shall be one-piece preformed flexible formed tubing with built-in closed cell vapor barrier. Seal laps and butt joints with moisture resistant adhesive to provide a continuous vapor seal. Cover all insulated suction lines exposed on the exterior of the building with E-Flex Guard by Airex Manufacturing, Inc. At exterior wall penetration provide Titan outlet by Airex Manufacturing, Inc. or equal with an Insulation thickness as follows:

	Nominal Pipe Diameter		
Refrigerant line set type	1” and less	1" to < 1½"	1 ½” and above
Located with-in the conditioned spaces			
Suction	½”	1”	1"
Liquid	not required		
Discharge (hi/low pressure)	1”	1"	1”
Located outside the conditioned spaces			
Suction	½”	1”	1"
Liquid	not required		
Discharge (hi/low pressure)	1 ½”	1 ½”	2”

E. Piping Insulation - Exterior (Outdoor) Piping:

1. Piping located outdoors shall be insulated as specified above. In-addition piping shall be covered with a weather-proof aluminum alloy 3003 or 3105 jacket meeting ASTM standard B209, minimum 0.016” think, installed per the manufacturers installation requirements. At a minimum the following installation shall occur. The jacketing overlap shall be a minimum of 2”. Horizontal piping shall have the jacket seams located at the 3 o’clock or 9 o’clock position with the seam joint openings point downward to shed moisture. Vertical piping shall have the upper jacket seams overlap the lower seam to shed moisture. Valve handles and gauges shall be positioned on the bottom to help prevent water penetration. Banding shall be used to secure the jacketing; screws, rivets, and all other fasteners capable of penetrating the underlying vapor retarder shall be prohibited. Jacketing sealant shall be applied to all longitudinal and circumferential joints and the sealant shall be located between the aluminum jacket, not at the outer lip.

F. Equipment Insulation:

1. Equipment shall be insulated with 2" thick fiberglass, minimum 6 pounds/cubic foot density. Insulation shall be finished with hydraulic setting insulating cement (1/2" thick), 6 ounce canvas, and one layer of Arabol over entire surface. Equipment to be insulated includes the following:

a. Hot water expansion tank
b. Air separator
c. Domestic hot water storage tank

2.8 VIBRATION ISOLATION

A. General:

1. All rotating equipment and appurtenances connected to rotating equipment shall be vibration isolated from the supporting structure. No metal to metal contact will be permitted between fixed and floating parts. All metal isolators exposed to weather shall be hot dipped galvanized after fabrication. Piping connected to rotating equipment shall be hung with spring hangers for first 50 pipe diameters.

B. Floor Mounted Spring Isolators:

1. Isolators shall be free standing, laterally stable, and include acoustical friction pads and leveling bolts. Isolators shall have a minimum ratio of spring diameter to operating spring height of 1.0 and an additional travel to solid equal to 50% of rated deflection.

C. Floor Mounted Neoprene Pads:

1. Isolators shall be neoprene waffle or combination neoprene and cork sandwich. Pads shall be sized and selected as per manufacturers loading requirements.

D. Spring Hangers:

1. Vibration hanger shall contain a spring and double deflection neoprene element in series. Spring shall have a diameter not less than 0.8 of compressed operating spring height. Spring shall have a minimum additional spring travel of 50 percent between design height and solid height. Spring shall permit a 15 degree angular misalignment without rubbing on hanger box.

2.9 SEISMIC SUPPORTS

A. All equipment, ductwork, and piping shall be seismically supported as required by the International Building Code, latest edition. Support details shall be as indicated on the Drawings.

2.10 CONTROL SYSTEM

A. General:

1. The Mechanical Contractor shall be responsible for a complete and operable control system, including equipment, installation, and accessories required to perform the required control functions. All control conduit and wiring shall be furnished by the Electrical Contractor. Thermostats, sub-base switches, remote control devices, etc., shall be supplied by the Mechanical Contractor and installed and connected by the Mechanical Contractor. The Mechanical Contractor shall furnish the Electrical Contractor with wiring diagrams for all mechanical equipment and controls.
2. The Mechanical Contractor shall be responsible for installing all control valves, water flow switches, temperature wells, control dampers, and related equipment which is furnished by the Control Contractor.
3. The control system shall be basically electric, with supplementary electronic devices as required.

B. Control Equipment and Accessories:

1. Control Dampers:

    a. All control dampers are to be furnished under this section, except those specified to be furnished with the air handling units. Damper blades shall be fabricated of 22-gauge galvanized sheet steel and frames shall be not less than 16-gauge galvanized steel. Blades shall be maximum 10 inches wide, 50 inches long, and shall be provided with neoprene gasketed edges and oilite bronze or nylon bearings. Dampers shall be ultra-low leakage, opposed blade type for proportional action and parallel blade type for two-position action. Leakage performance shall be a maximum of 3 cfm per sq, ft. @ a pressure differential of 1” w.g. Provide damper operators for all motorized dampers and louvers. Belimo or approved equal. Submittals shall include leakage and pressure drop data for all control dampers. All outside air dampers shall fail closed.

2. Control Valves:

    a. Control valves 2-1/2" and smaller shall be screwed, 3" and larger shall be grooved or flanged. Screwed valves shall be bronze or cast brass, grooved valves shall be ductile iron, and flanged valves shall be cast iron or cast steel. Three way valves shall have contoured plugs for linear flow characteristics and constant total flow throughout the stem travel. Straight-thru valves shall be single seated and have equal percentage characteristics for water service. Flat discs shall be used for on-off control only. All valves shall be stainless steel stems, replaceable seats, and self-adjusting Teflon or rubber packing. All heating control valves shall fail open. Belimo or approved equal.

3. Air Duct Smoke Detector:

    a. Smoke detector shall be products of combustion detector and shall be UL listed. The unit shall be designed for detection of combustion gases, fire, and smoke in air ducts in compliance with NFPA Pamphlet 90A. The sheet metal contractor shall provide a minimum 18”x18” hinged access door, in inaccessible ceilings, for each detector that is furnished. The sheet metal contractor is also responsible for providing all necessary transitions in the ductwork for mounting of the duct detector.

4. Thermostats:

    a. Thermostats shall be 7-day programmable type, with automatic changeover from heating to cooling, be provided with auxiliary contacts.
    b. Thermostats shall be provided with lockable covers.
    c. Thermostats installed on exterior walls shall be mounted on an insulating block, or on foam insulation filled J-box.
    d. All thermostats shall have a mounting height of 46 inches, to the centerline of the device, unless otherwise noted on electrical drawings.

5. Equipment Control Schematics:

    a. See Drawings for schematics and sequence of operations.

PART 3 - EXECUTION

3.1 WORKMANSHIP

A. General:

1. Install all materials and equipment as shown and in strict accordance with the applicable codes for the State and/or city. Plans do not attempt to show exact details of all piping and ductwork, and no extra payment will be allowed for offsets required due to obstructions by other trades. All work shall be done in a neat and orderly fashion and left in a condition satisfactory to the Architect/Engineer.

2. All piping shall be run parallel or perpendicular to established building lines. Install piping so as to allow for expansion. Install all valves with stems horizontal or above. Install air vents at all high points. Provide all piping which passes through walls, floors, or ceilings with standard weight pipe sleeves.

3. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Gasket shall be molded and produced by the grooved coupling manufacturer. Verify gasket grade is suitable for the intended service. The grooved coupling manufacturer's factory trained representative shall provide on-site training for the contractor's field personnel in the use of grooving tools, application of groove, and installation of groove end products.

4. Install the grooved piping and fittings in accordance with the latest recommendations as published by the manufacturer. Pipe shall be square cut, +/-0.030", properly deburred and cleaned. Mark pipe ends at the required location using a gauge supplied by the Manufacturer to ensure full insertion into the coupling or fitting during assembly. Use a manufacturer's tool with proper sized jaw for pressing.

B. Insulation:

1. All piping insulation shall be applied over clean, dry surfaces after system has been pressure tested and any leaks corrected. Finished appearance of all insulation shall be smooth and continuous. Provide coat of insulating cement where needed to obtain this result.

2. Flexible duct insulation shall be secured to duct surface with 4-inch wide bands of adhesive applied on maximum 18-inch centers. Additional galvanized tie-wire support shall be furnished as required and recommended by the insulation manufacturer.

C. Diffusers, Registers and Grilles:

1. All diffusers, grilles, and registers shall be installed tight on their respective mounting surfaces and shall be accurately centered on ceiling tile, recesses, windows, or doors.

D. Ductwork:

1. All sheet metal work shall be done by qualified, experienced mechanics in accordance with the requirements of ASHRAE and the latest edition of the applicable SMACNA Manual. All ductwork shall be installed in a neat and orderly manner, and shall be adequately supported to prevent vibration or sagging. All sheet metal ductwork shall be sealed with United-Sheet Metal Duct Sealer or equal.

E. Makeup Air Units:

1. Units shall be installed approximately where shown on the plans to provide access space for filter changing, motor, drive and bearing servicing, and fan shaft and coil removing. Pipe drain pan connection through a running trap to floor drain. Unit shall not be operated until filters are installed. Isolate sheet metal ducts from all fans with flexible connectors.

F. Condensing Units/ Heat Pumps:

1. Units located at grade shall be positioned such that they are beyond the roof drip line. Units shall be installed on a 6” concrete pad.

2. Units located on flat rooftops shall be provided with Miro Industries Model HD, or equal, heavy duty galvanized roof support with adjustable legs, sized 6 inches larger, in each direction, than equipment footprint.

END OF SECTION 230100

SECTION 230150 - MECHANICAL START-UP

PART 1 - GENERAL

1.1 SCOPE:

A. General:

1. The purpose of the mechanical start-up is to provide the owner of the facility with a high level of assurance that the mechanical system has been installed and operates per the requirements of the mechanical construction plans and specifications. The Mechanical General Provisions, Section 230000, is to be included as a part of this section of the specifications.

B. Pre-start and Start-up checklist:

1. The contractor shall be responsible for the completion of pre-start and start-up checklist forms. These forms can usually be obtained from the equipment manufacturer.
2. After completion of pre-start and start-up checklists, the contractor shall provide a copy of the pre-start and start-up checklist to the engineer for review and approval prior to substantial completion.
3. Approved Mechanical Equipment Start-up forms shall be included in the operations and maintenance manual.

PART 2 - START-UP PROCESS

2.1 RESPONSIBILITIES

A. Mechanical Contractor:

1. Coordinate with other trades involved in the installation of mechanical equipment to complete the requirements of mechanical start-up specifications.
2. Complete the pre-start and start-up checklist forms obtained from the equipment manufacturer.
3. Notify the mechanical engineer of tests to be witnessed. Contractor shall give the engineer a minimum of 48 hours notice prior to test.

B. Engineer:

1. Review the completed pre-start and start-up check lists provided by the mechanical contractor.
2. At final inspection, spot check items on the pre-start and start-up checklist forms to ensure that they have been completed.

2.2 EQUIPMENT PRE-START

A. Before starting any equipment or system, complete the system pre-start checklist forms. As part of the pre-start process, the following items shall be completed as applicable:

1. Piping systems shall be pressure tested as specified, found to be tight, with reports submitted.
2. Piping systems shall be flushed and cleaned as specified, all required reports submitted, and the system shall be filled or charged per plans.
3. Air system cleaning is complete and final filters shall be installed.
4. Vibration isolation and seismic restraints shall be installed per plans and specifications.
5. Equipment drives shall be aligned.
6. Electrical services shall be installed and checked.
7. Control points checkouts shall be completed.
8. Safety controls shall be installed and operation checked.
9. Manufacturer's representatives have carried out major equipment start-up, and all checks shall be documented on the relevant checklists as they are carried out.
10. Equipment has been thoroughly cleaned (interior and exterior of units), of construction debris.
11. Deficiencies or incomplete work shall be corrected and pre-start shall be repeated until the installation is ready for operation.

2.3 EQUIPMENT START-UP

A. After the pre-start up process described in Section 2.2, complete the system start-up checklist and document findings with forms provided. As part of the Start-up process, the following items shall be completed as applicable:

1. Air systems balanced as specified in plans and specifications.
2. Water systems balanced as specified in plans and specifications.
3. Problems revealed during balancing of air and water systems shall be corrected.
4. All automatic temperature controls devices shall be calibrated, including adjustments to control valves and damper actuators.
5. Set up or program controls for accurate response and precise sequencing to meet specified performance.
6. The controls contractor and balancing contractor shall adjust and set air flows and calibrate controls of equipment as applicable.
7. Ensure final adjustments to vibration isolation and seismic restraints are carried out per the manufacturer's requirements.
8. Check the operation of all fire dampers; smoke dampers and combination fire/smoke dampers.

B. Deficiencies or incomplete work shall be corrected, and the startup shall be repeated until correct installation and function has been confirmed and the installation is ready for engineer verification.

2.4 TRAINING AND INSTRUCTION

A. Once the substantial completion has been approved, the mechanical contractor shall provide the Owner and engineer with a training schedule for operation of the mechanical equipment and systems and their controls as listed in the specifications and plans. Reference Section 230000 Mechanical General Provisions, "Project Closeout" of these specifications.

PART 3 - EXECUTION

A. The following systems and equipment shall be completed under the mechanical start-up plan as described above and documented with equipment pre-start and start-up forms provided.

1. Electric Unit Heaters
2. Gas Unit Heaters
3. Makeup Air Units
4. Exhaust Fans
5. Gas Detection System
6. Ductless Split Systems
7. Electric Heaters

B. Pre-start and start-up forms are to be provided to the engineer for final approval before substantial completion.

C. Approved forms shall be included in the operations and maintenance manual.

END OF SECTION

Electrical Specifications

SECTION 26 05 00

ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

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

B. Provisions of this Section shall apply to all Sections of Division 26, 27, and 28.

1.2 SCOPE OF WORK

A. Furnish and install all materials and equipment and provide all labor required and necessary to complete the work shown on the drawings and/or specified in all Sections of Division 26 and all other work and miscellaneous items, not specifically mentioned, but reasonably inferred for a complete installation, including all accessories required for testing the system. It is the intent of the drawings and specifications that all systems be complete and ready for operation.

1.3 CODE COMPLIANCE

A. All work and materials shall comply with the latest rules, codes and regulations, including, but not limited to, the following:

B. Occupational Safety and Health Act Standards (OSHA)

C. NFPA #70 – National Electric Code (NEC)

D. ADA Standards – Americans with Disabilities Act

E. ANSI/IEEE C-2 – National Electrical Safety Code

F. NECA – Standard of Installation

G. International Building Code

H. International Fire Code

I. International Energy Conservation Code

J. NFPA #72 – Fire Code

K. NFPA #101 – Life Safety Code

L. All other applicable Federal, State and local laws and regulations.

M. Work to be executed and inspected in accordance with local codes and ordinances. Permits, fees or charges for inspection or other services shall be paid for by the contractor. Local codes and ordinances are to be considered as minimum requirements and must be properly executed without expense to the owner; but do not relieve the contractor from work shown that exceeds minimum requirements.

1.4 CONDITIONS AT SITE

A. Visit to site is recommended of all bidders prior to submission of bid. All will be held to have familiarized themselves with all discernible conditions and no extra payment will be allowed for work required because of these conditions, whether specifically mentioned or not.

B. Lines of other service that are damaged as a result of this work shall be promptly repaired at no expense to the owner to the complete satisfaction of the owner.

1.5 DRAWINGS AND SPECIFICATIONS

A. All drawings and all specifications shall be considered as a whole and work of this Division shown anywhere therein shall be furnished under this Division.

B. Drawings are diagrammatic and indicate the general arrangement of equipment and wiring. Most direct routing of conduits and wiring is not assured. Exact requirements shall be governed by architectural, structural and mechanical conditions of the job. Consult all other drawings in preparation of the bid. Extra lengths of wiring or addition of pull or junction boxes, etc., necessitated by such conditions shall be included in the bid. Check all information and report any apparent discrepancies before submitting bid.

C. Change to location, type, function, brand name, finish, etc., shall not be made without permission of engineer.

D. Some equipment is specifically designated on the drawings. It is not the intent to sole source any item unless explicitly stated. Items have been specified based upon design requirements. All bidders are encouraged to submit products for approval. Prior approval must be obtained as required by these contract documents. Bids submitted with non-approved items will be considered invalid and bidders will be held to provide approved materials at no additional cost to the owner. Submittals received by the engineer after award of contract on non-approved equipment will not be reviewed nor will they be returned.

E. Where conflicting direction is given within the specifications and drawings, the contractor shall include the most expensive option in the bid.

1.6 SAFETY AND INDEMNITY

A. Safety: The contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.

B. No act, service, drawing review or construction review by the owner is intended to include review of the adequacy of the contractor’s safety measures in, on, or near the construction site.

1.7 CONSTRUCTION OBSERVATION BY THE ENGINEER

A. Prior to covering: any major portion of the materials installed under this section, notify the engineer so that an observation can be made. Notification shall be made at least three (3) working days in advance of the date the items will be covered.

1.8 INSTRUCTION OF OWNER’S PERSONNEL

A. The contractor shall conduct an on-site instructional tour of the entire project. The personnel designated by the owner shall be instructed in: operation of all electrical systems, trouble-shooting procedures, preventative maintenance procedures, uses of Operation and Maintenance manuals, maintenance and cleaning of lighting fixtures and operation of all special systems.

B. Contractor will include in his bid 8 hours of instruction time to be held at the project location after substantial completion for instruction of owner's personnel. Coordinate time and number of owner personnel to be present and provide schedule to engineer.

1.9 PROJECT COMPLETION

A. Upon completion of all work and operational checks on all systems, the contractor shall request that a final construction observation be performed.

B. The engineer shall compile a punch list of items to be completed or corrected. The contractor shall notify the engineer upon completion of the items.

1.10 GUARANTEE

A. All work under this section shall be guaranteed in writing to be free of defective work, materials, or parts for a period of one (1) year after final acceptance of the work under this contract or the period indicated under the Division 1 specifications whichever is longer.

B. Repair, revision or replacement of any and all defects, failure or inoperativeness shall be done by the contractor at no cost to the owner.

PART 2 - PRODUCTS

2.1 MATERIAL APPROVAL

A. The design, manufacturer and testing of electrical equipment and materials shall conform to or exceed latest applicable NEMA, IEEE or ANSI standards.

B. All materials must be new, unless noted otherwise, and UL listed. Materials that are not covered by UL testing standards shall be tested and approved by an independent testing laboratory or a governmental agency, which laboratory shall be acceptable to the owner and code enforcing agency.

2.2 SHOP DRAWINGS AND MATERIALS LIST

A. Submit an electronic copy, unless noted otherwise under Division 1, of the Division 26, 27 and 28 shop drawings and material lists proposed for this project to the architect/engineer for review.

2.3 OPERATION AND MAINTENANCE MANUALS

A. Submit an electronic copy, unless noted otherwise under Division 1, of the Operation and Maintenance Manuals for all Division 26, 27 and 28 equipment to the architect/engineer.

2.4 RECORD DRAWINGS

A. Submit record drawings to owner.

B. PRODUCT DELIVERY, STORAGE AND HANDLING

C. Deliver, store, and handle materials in a manner to prevent damage.

D. Protect equipment from weather and dampness.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND CONTRACTOR'S QUALIFICATIONS

A. Only quality workmanship will be accepted. Haphazard or poor installation practice will be cause for rejection of work.

B. Provide experienced foreman with a minimum of three years experience working on this type of building placed in charge of this work at all times.

3.2 COORDINATION

A. Coordinate work with other trades to avoid conflict and to provide correct rough-in and connection for equipment furnished under trades that require electrical connections. Inform contractors of other trades of the required access to and clearances around electrical equipment to maintain serviceability and code compliance.

B. Verify equipment dimensions and requirements with provisions specified under this Section. Check actual job conditions before fabricating work. Report necessary changes in time to prevent needless work. Changes or additions subject to additional compensation, which are made without the authorization of the owner, shall be at contractor's risk and expense.

3.3 MANUFACTURER'S INSTRUCTIONS

A. All installations are to be made in accordance with manufacturer's recommendations. A copy of such recommendations shall at all times be kept in the job superintendent's office and shall be available to the engineer.

B. Follow manufacturer's instructions where they cover points not specifically indicated on drawings and specifications. If they are in conflict with the drawings and specifications obtain clarification from the engineer before starting work.

3.4 QUALITY ASSURANCE

A. The contractor shall insure that all workmanship, all materials employed, all required equipment and the manner and method of installation conforms to accepted construction and engineering practices, and that each piece of equipment is in satisfactory working condition to satisfactorily perform its functional operation.

B. Provide quality assurance tests and operational check on all components of the electrical distribution system, all lighting fixtures, and special systems.

3.5 CUTTING AND PATCHING

A. Perform all cutting and fittings required for work of this section in rough construction of

the building.

B. All patching of finished construction of building shall be performed under the sections of specifications covering these materials.

C. No joists, beams, girders or columns shall be cut by any contractor without obtaining written permission from the architect/engineer.

END OF SECTION

SECTION 26 05 19

CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

B. SUBMITTALS

C. Submit shop drawings and product data.

1.3 COORDINATION

A. Coordinate layout and installation of cables with other installations.

B. Revise locations and elevations from those indicated, as required to suit field conditions and as approved by the owner.

PART 2 - PRODUCTS

2.1 BUILDING WIRES AND CABLES

A. Conductors: Stranded, copper, 600 volt insulation, type THHN/THWN, THHN/THWN-2, XHHN/XHHW.

B. Conductors:

C. Solid or stranded for No. 10 and smaller, stranded for No. 8 and larger, copper, 600 volt insulation, type THHN/THWN. Aluminum conductors not allowed unless noted otherwise.

D. Insulation Types: THWN-2 for underground, THWN for wet locations, THHN for dry locations; XHHN/XHHW for GFI branch circuits and feeders fed from GFCI breakers.

E. Color-code 208/120-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:
1. Phase A: Black.
2. Phase B: Red.
3. Phase C: Blue.
4. Neutral: White.
5. Ground: Green.
6. Isolated ground: Green with yellow tracer.

F. Wire connectors and splices: units of size, ampacity rating, material, type and class

suitable for service indicated.

G. Signal and communication circuits:
   1. Special cables as indicated on the drawings.
   2. Conductors for general use: stranded copper conductor, #16 AWG minimum, with THWN-2 insulation for underground, THWN for wet locations and THHN insulation for dry locations.

PART 3 - EXECUTION

3.1 GENERAL WIRING METHODS

A. Examine raceways and building finishes to receive wires and cables for compliance with requirements for installation tolerances and other conditions affecting performance of wires and cables. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Use no wire smaller than #12 AWG for power and lighting circuits and no smaller than #18 AWG for control wiring.

C. The contractor is responsible for upsizing conductor sizes to ensure the maximum voltage drop of any branch circuit does not exceed 3%. For reference, use No. 10 AWG conductor for 20 Amp, 120 volt branch circuits longer than 75 feet, and for 20 Amp, 277 volt branch circuits longer than 200 feet.

D. Place an equal number of conductors for each phase of a circuit in the same raceway or conduit.

E. Splice only in junction or outlet boxes.

F. Neatly train or lace wiring inside boxes, equipment, and panelboards.

G. Make conductor lengths for parallel circuits equal.

H. Provide a separate neutral conductor for each ungrounded conductor. Ungrounded conductors may share a neutral when all of the following conditions are met:

I. The ungrounded conductors are connected to a multi-pole breaker or breakers that are clipped together with a UL listed means that provide a common trip.

J. The ungrounded conductors contained in the same conduit or raceway.

K. The ungrounded conductors all originate from a separate and unique phase bus in the panel.

3.2 INSTALLATION

A. Install wires and cables as indicated, according to manufacturer's written instructions, and the “National Electrical Installation Standards" by NECA.

B. Remove existing wires from raceway before pulling in new wires and cables.

C. Pull Conductors: Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed

manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means; including fish tape, cable, rope, and basket weave wire/cable grips that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

F. Support cables above accessible ceilings; do not rest on ceiling tiles. Do not fasten cables to ceiling support wires. Use cable ties to support cables from structure.

3.3 CONNECTIONS

A. Conductor Splices: Keep to minimum.

B. Install splices and tapes that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.

C. Use splice and tap connectors compatible with conductor material.

D. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

E. Connect outlets and components to wiring and to ground as indicated and instructed by manufacturer.

F. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

G. Terminate spare conductors with electrical tape.

3.4 LABELING

A. Provide Brady wire markers or equivalent on all conductors. All wire shall be labeled in each box and panel with the circuit number and panel identification.

3.5 FIELD QUALITY CONTROL

A. Inspect wire and cable for physical damage.

B. Perform continuity testing on all power and equipment branch circuit conductors. Verify proper phasing connections.

END OF SECTION

SECTION 26 05 26

GROUNDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Fixed Price Construction Contract and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.3 SYSTEM DESCRIPTION

A. Ground the electrical service system neutral at service entrance equipment to concrete encased electrode, metal underground water pipe, and effectively grounded metal frame of building.

B. Ground each separately-derived system neutral to nearest effectively grounded metal structural frame of building or point of service entrance ground.

C. Provide communications system grounding conductor to point of service entrance ground.

D. Bond together system neutrals, service equipment enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductors in raceways and cables, receptacle ground connectors, and plumbing systems.

PART 2 - PRODUCTS

2.1 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Section 26 05 19 - Conductors and Cables.

B. Material: Copper.

C. Equipment Grounding Conductors: Insulated with green-colored insulation. Where green insulation is not available, on larger sizes, black insulation shall be used and suitably identified with green tape at each junction box or device enclosure.

D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow tracer. Where not available, green and yellow tape at each junction box or device enclosure.

E. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.

F. Bare Copper Conductors: Medium hard drawn copper conductor, stranded, sized as shown on the drawings.

G. Hardware: Bolts, nuts and washers shall be bronze; cadmium plated steel or other non-corrosive material, approved for the purpose.

H. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.2 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

D. Below grade compression fittings: Thomas & Betts, Series 52000, 53000, and 54000 or equivalent.

E. Use connector and sealant approved for purpose on all below grade clamp or compression type connections.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel, 5/8 inch diameter, minimum length 8 feet.

PART 3 - EXECUTION

3.1 APPLICATION

A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.

B. In raceways, use insulated equipment grounding conductors.

C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections.

D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

E. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Use insulated spacer; space 1 inch from wall and support from wall 6 inches above finished floor, unless otherwise indicated.

F. Underground Grounding Conductors: Use copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches below grade.

3.2 EQUIPMENT GROUNDING CONDUCTORS

A. Comply with NEC Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NEC are indicated.

B. Install equipment grounding conductors in all feeders and circuits.

C. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by NEC:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.

D. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.

E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

F. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways bonded to outlet or equipment, sized per Section 250 of the NEC.

G. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on grounding bar.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

H. Provide green insulated ground conductor to exterior post light standards.

I. Provide grounding and bonding at pad-mounted transformer in accordance with Section 26 12 00.

3.3 INSTALLATION

A. Ground Rods: Where indicated, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.

1. Drive ground rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, unless otherwise indicated. Make connections without exposing steel or damaging copper coating.

B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use

exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

D. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

E. UFER Ground (Concrete-Encased Grounding Electrode): Fabricate according to NEC 250, using a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to a grounding electrode external to concrete.

3.4 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values.

F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to

make a visible indication that a connector has been adequately compressed on grounding conductor.

G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.5 SYSTEM NEUTRAL GROUND

A. Ground the neutral conductor of each transformer or generator to limit the maximum potential above ground due to normal operating voltage and limit the voltage level due to abnormal conditions.

B. Ground generators or transformers with secondary voltage 600 volt or less as follows:

C. 3 phase, 4 wire Wye connected: ground neutral point

D. For transformers 75 kVA or smaller with primary voltage 480 volt or less the primary equipment ground conductor may be used for grounding the secondary neutral provided it is adequately sized in accordance with NEC system ground conductor size.

3.6 EQUIPMENT GROUND

A. Ground non-current carrying metal parts of electrical equipment enclosures, frames, conductor raceways or cable trays to provide a low impedance path for line-to-ground fault current and to bond all non-current carrying metal parts together. Install a grounding conductor in each raceway system. Equipment grounding conductor shall be electrically and mechanically continuous from the electrical circuit source to the equipment to be grounded. Size grounding conductors per NEC 250 unless otherwise shown on the drawings.

B. Install metal raceway couplings, fittings, and terminations secure and tight to ensure good grounding continuity. Provide grounding conductor sized per NEC through all raceway and conduit systems.

C. Lighting fixtures shall be securely connected to equipment grounding conductors. Outdoor lighting standards shall have a factory installed ground lug for terminating the grounding conductor.

D. Motors shall be connected to equipment ground conductors with a bolted solderless lug connection on the metal frame.

3.7 FIELD QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

END OF SECTION

SECTION 26 05 33

RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. FMC: Flexible metal conduit.

C. IMC: Intermediate metal conduit.

D. LFMC: Liquidtight flexible metal conduit.

E. RMC: Rigid metal conduit.

F. RNC: Rigid Polyvinyl Chloride conduit.

G. PVC: Rigid Polyvinyl Chloride conduit

H. HDPE: High Density Polyethylene Conduit

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.5 COORDINATION

A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Rigid Steel Conduit: ANSI C80.1.

B. IMC: ANSI C80.6.

C. PVC coated Steel Conduit and Fittings: NEMA RN 1; rigid steel conduit with external 40

mil PVC coating and internal two mil urethane coating.

D. EMT and Fittings: ANSI C80.3. Fittings: Set-screw type.

E. FMC: Zinc-coated steel.

F. LFMC: Flexible steel conduit with PVC jacket. Fittings: NEMA FB 1; compatible with conduit/tubing materials.

2.2 NONMETALLIC CONDUIT AND TUBING

A. RNC: NEMA TC 2, Schedule 40 PVC. Fittings: NEMA TC 3; match to conduit and material.

2.3 METAL WIREWAYS

A. Material: Sheet metal sized and shaped as indicated.

B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

C. Finish: Manufacturer's standard enamel finish.

2.4 OUTLET AND DEVICE BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Cast-Metal Boxes: NEMA FB 1, Type FD, cast box with gasketed cover.

2.5 FLOOR BOXES

A. Floor Boxes: Cast metal, fully adjustable, rectangular, unless otherwise specified.

2.6 PULL AND JUNCTION BOXES

A. Small Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Cast-Metal Boxes: NEMA FB 1, cast aluminum with gasketed cover.

2.7 ENCLOSURES AND CABINETS

A. Hinged-Cover Enclosures: NEMA 250, Type 1, 3R, or 4, with continuous hinge cover and flush latch, key operable.

B. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

C. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage, and include accessory feet where required for freestanding equipment.

2.8 J-HOOKS

A. J-hooks: Steel, rated for indoor use in non-corrosive environments. J-hooks shall be

rated to support Category 5e cable.

B. Fittings and Support Bodies: Manufacturer's recommended fittings including side mount flange clips, bottom mount flange clips, beam clamp, rod and flange clip, C & Z purlin clip, and all other components and assemblies to make the system work.

C. Acceptable Product: Caddy CableCat Hanging System, 1-5/16" and 2" hooks, or approved equal

D. Acceptable Manufacturer: Erico Fastening Products or approved equal.

E. J-hook Supports: Manufacturer's recommended fastening devices.

2.9 INNERDUCT

A. Innerduct: NEMA TC 5. UL Listed, corrugated, specifically designed for optical fiber cable pathways.

B. Acceptable Manufactures: Arnco, Carlon, Dura-line, and Pyramid.

C. Composition:
1. Non-plenum rated: Polyethylene (PE), or High Density Polyethylene (HDPE).
2. Plenum rated: per manufacturer.

D. Nominal Size: 1" (inside diameter), minimum.

E. Pulling Strength: minimum of 600 pounds.

F. Color: Orange, solid.

G. Fittings and Innerduct Bodies: Manufacturer's recommended fittings including couplings, adapters, end caps, end bells, expansion couplings, plugs, sleeves, a full compliment of connective devices, and all other components to make the system work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRING METHODS

A. Outdoors: Use the following wiring methods:

1. Exposed: Rigid steel or IMC.
2. Concealed: Rigid steel or IMC.
3. Underground, Single Run: RNC or PVC Externally Coated Rigid Steel Conduit where required by NEC 517.13.
4. Underground, Grouped: RNC or PVC Externally Coated Rigid Steel Conduit where required by NEC 517.13.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
6. Boxes and Enclosures: NEMA 250, Type 3R or Type 4.

B. Indoors: Use the following wiring methods:
1. Exposed: EMT or “Wiremold” metallic raceways or equal.
2. Exposed in public areas: “Wiremold” metallic raceways or equal. Use of exposed raceways in public areas must be approved by the architect prior to installation for each location. Use of exposed EMT in areas visible to the public is not allowed unless specifically approved by the architect prior to installation. Replacement of unapproved installations of exposed raceways will be at the expense of the contractor if deemed necessary by the architect or engineer.
3. Concealed: EMT, MC-Cable, Hospital Grade MC-Cable for all Patient Care Areas. Note:MC-Cable is not approved for “homeruns”
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except in wet or damp locations, use LFMC.
5. Damp or Wet Locations: Rigid steel conduit.
6. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
   a. Damp or Wet Locations: NEMA 250, Type 4, stainless steel.

3.3 INSTALLATION

A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions.

B. Minimum Raceway Size: 1/2-inch trade size. 3/4-inch minimum for “homeruns”.

C. Conceal conduit and EMT, unless otherwise indicated, within finished walls, ceilings, and floors.

D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

E. Install raceways level and square and at proper elevations. Provide adequate headroom.

F. Complete raceway installation before starting conductor installation.

G. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping.

H. Use temporary closures to prevent foreign matter from entering raceways.

I. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

J. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.

K. Use raceway fittings compatible with raceways and suitable for use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings, unless otherwise indicated.

L. Run concealed raceways, with a minimum of bends, in the shortest practical distance considering the type of building construction and obstructions, unless otherwise indicated.

M. Raceways Embedded in Slabs: Install in middle third of slab thickness where practical, and leave at least 1-inch concrete cover.
1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
2. Space raceways laterally to prevent voids in concrete.
3. Run conduit larger than 1-inch trade size parallel to or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
4. Transition from nonmetallic tubing to rigid steel conduit or IMC before rising above floor.

N. Install exposed raceways parallel to or at right angles to nearby surfaces or structural members, and follow the surface contours as much as practical.
1. Run parallel or banked raceways together, on common supports where practical.
2. Make bends in parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

O. Join raceways with fittings designed and approved for the purpose and make joints tight.
1. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.
2. Use insulating bushings to protect conductors.

P. Tighten set screws of threadless fittings with suitable tools.

Q. Terminations: Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against the box. Where terminations are not secure with 1 locknut, use 2 locknuts: 1 inside and 1 outside the box.

R. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.

S. Install pull wires in empty raceways. Utilize polyester line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of the pull wire.

T. Telephone and Signal System Raceways: In addition to the above requirements, install raceways in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

U. Install raceway sealing fittings according to manufacturer's written instructions. Locate fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank

cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as the boundaries of refrigerated spaces.
2. Where conduit pass from the interior to the exterior of a building.
3. Where otherwise required by NEC.

V. Apply firestopping to cable and raceway penetrations of fire-rated floor, ceiling, and wall assemblies to achieve fire-resistance rating of the assembly. Boxes installed in fire-rated floor, ceiling, and wall assemblies shall result in no larger than a 16 square-inch penetration in the fire-rated wall surface and the quantity of penetrations shall not be greater than 100 square-inches for every 100 square feet of fire-rated wall area. Where boxes are located on both sides of a fire-rated wall, the boxes shall have a minimum of a 24” horizontal spacing, where a 24” horizontal spacing cannot be achieved, furnish and install listed fire-rated putty on the boxes as required by the IBC.

W. Route conduit through roof openings for piping and ductwork where possible; otherwise, install roof penetrations in accordance with roofing system requirements. Coordinate with roofing installer.

X. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded flush plugs flush with floor for future equipment connections.

Y. Flexible Connections: Use maximum of 6 feet of flexible conduit for recessed and semi-recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet or damp locations. Install separate ground conductor across flexible connections.

Z. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.

AA. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying the raceways to receptacle or fixture ground terminals.

BB. Conduits shall not be routed on or above the roof without prior approval from the Engineer. Instead, the branch circuits shall be routed at the structure level below the roof to feed roof-top equipment. When approval is granted to route conduits on or above the roof, the conduits shall be strapped to COOPER industries DB series support blocks at intervals not exceeding NEC requirements. The conduits shall not be rested directly on the roof. It shall be permissible to penetrate the roof adjacent mechanical or electrical equipment to power that respective equipment.

3.4 SUPPORT INSTALLATION

A. Install support devices to securely and permanently fasten and support electrical components.

B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.

C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type

hangers, at least every 8 feet.

D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.

E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.

F. Install 1/4-inch diameter or larger threaded steel hanger rods, unless otherwise indicated.

G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.

H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.

I. Simultaneously install vertical conductor supports with conductors.

J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box.

K. Install metal channel racks for mounting cabinets, panelboards; disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.

L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

M. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit. Perform fastening according to the following unless other fastening methods are indicated:
   1. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
   2. New Concrete: Concrete inserts with machine screws and bolts.
   3. Existing Concrete: Expansion bolts.
   4. Steel: Spring-tension clamps on steel.
   5. Light Steel: Sheet-metal screws.
   6. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

N. Do not drill structural steel members.

O. All supports and attachments shall meet project seismic zone requirements.

3.5 BOX INSTALLATION

A. Do not install boxes back-to-back in walls.

B. Locate boxes in masonry walls to require cutting of masonry unit edge only. Coordinate masonry cutting to achieve neat openings for boxes.

C. Provide knockout closures for unused openings.

D. Support boxes independently of conduit except for cast boxes that are connected to two rigid metal conduits, both supported within 12 inches of box.

E. Use 4” boxes with multiple-gang mudring where more than one device are mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.

F. Install boxes in walls without damaging wall insulation.

G. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

H. Position outlets to locate lighting fixtures as shown on reflected ceiling plans.

I. In inaccessible ceiling areas, position outlets and junction boxes within 6 inches of recessed luminaire, to be accessible through luminaire ceiling opening.

J. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud walls, and adjustable steel channel fasteners for flush ceiling outlet boxes.

K. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.

L. For boxes installed in metal construction, use rigid support metal bar hangers or metal bar fastened to two studs or with metal screws to metal studs.

M. Set floor boxes level and adjust to finished floor surface.

N. Set floor boxes level and trim after installation to fit flush to finished floor surface.

O. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

P. Locate pull and junction boxes above accessible ceilings or in unfinished areas. Support pull and junction boxes independent of conduit.

Q. Minimum box size to be 4” square by 2 1/8” deep.

3.6 LABELING

A. Label coverplate of all pull and junction boxes by system served. Indicate panel circuits for power and lighting boxes.

3.7 CLEANING

A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION

SECTION 26 05 43

UNDER SLAB AND UNDERGROUND ELECTRICAL WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes under slab conduits and related electrical work.

PART 2 - PRODUCTS

2.1 CONDUIT

A. All shall be provided with fittings and accessories approved for the purpose. Refer to Section 26 05 33.

2.2 PRECAST CONCRETE MANHOLE

A. Structural reinforced, size as indicated, with inserts for cable racks and pully eyes.

2.3 BARE COPPER GROUND CONDUCTOR

A. Medium hard drawn copper conductor, # 4/0 AWG stranded (unless otherwise noted).

PART 3 - EXECUTION

3.1 GENERAL

A. Electrical system layouts indicated on the drawings are generally diagrammatic, but shall be followed as closely as actual construction and work of other trades will permit.

3.2 CONDUIT INSTALLATION

A. Plastic conduit shall be installed on 2 inch sand base and covered by 2 inch sand back fill. Multiple runs shall maintain 3 inch minimum separation between runs. Plastic conduit shall not be installed in rock base.

B. Underground conduit entering building shall be provided with one 10 foot section of rigid steel conduit at point of penetration of foundation, footing or basement wall, with approximately equal lengths inside and outside building line. Ream the smaller inside diameter conduit smooth to prevent conductor damage.

C. Stagger conduit couplings by a minimum of 12 inches. All risers to grade shall be rigid steel.

D. All rigid steel conduits shall be encased in 3 inch minimum concrete envelope.

E. After completion of concrete encased duct bank, a 12 inch mandrel, ¼ inch less in diameter than a conduit, shall be pulled through each conduit.

F. Install 1/8 inch diameter pull line in each underground conduit.

G. Burial depths of conduits shall comply with the NEC (minimum).

H. Provide underground type plastic line markers: permanent, brightly colored, continuously printed plastic tape, intended for direct burial service, not less than 6 inches wide, reading “Caution Buried Electrical Line.” Install continuous line markers located directly over buried line at 6 inches above top of conduit, during back filling operation.

3.3 CONCRETE DUCT BANK CONSTRUCTION

A. Provide plastic spacers at maximum 5’-0” centers to maintain 3 inch spacing between conduits.

B. Drive two reinforcing bars to anchor the conduits at 10’-0” on centers to prevent floating during concrete pour.

C. Provide one warning tape (see 3.2.H. above) for each 12 inch width of concrete duct bank.

END OF SECTION

SECTION 26 08 00

LIGHTING SYSTEMS COMMISSIONING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. This Section includes requirements for commissioning the lighting system and its controls.

B. The registered design professional is responsible to provide evidence of lighting systems commissioning and completion in accordance to the provisions of this section.

1.3 DEFINITIONS:

A. Architect: Includes Architect identified in the Contract for Construction between Owner and Contractor, plus consultant/design professionals responsible for design of HVAC, electrical, communications, controls for HVAC systems, and other related systems.

B. RDP: Registered Design Professional

C. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.

1.4 COMMISSIONING DOCUMENTATION:

A. Commissioning Plan: A commissioning plan will be developed by a registered design professional or approved agency and shall include the following items:

1. A narrative description of the activities that will be accomplished during each phase of commissioning, including the personnel intended to accomplish each of the activities.
2. A listing of the specific equipment, appliances or systems to be tested and a description of the tests to be performed.
3. Functions to be tested.
4. Conditions under which the test will be performed.
5. Measurable criteria for performance

B. Test Checklists: RDP, with assistance of Architect/Engineer, shall develop test checklists for each system, subsystem, or equipment including interfaces and interlocks, and include a separate entry, with space for comments, for each item to be tested. Prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. Provide space for testing personnel to sign off on each checklist.

1. Name and identification of tested item.
2. Test number.
3. Time and date of test.
4. Indication of whether the record is for a first test or retest following correction of a problem or issue.
5. Date of the test and name of parties involves as applicable.
6. Individuals present for test.
7. Deficiencies/Issues/Results of test.
8. Note if re-test is necessary.

C. Test and Inspection Reports: RDP shall record test data, observations, and measurements on test checklists. Photographs, forms, and other means appropriate for the application shall be included with data. RDP shall compile test and inspection reports and tests and inspection certificates and include them in systems manual and commissioning report.

D. Corrective Action Documents: RDP shall document corrective action taken for systems and equipment that fail tests. Include required modifications to systems and equipment and revisions to test procedures, if any. Retest systems and equipment requiring corrective action and document retest results.

E. Issues Log: RDP shall prepare and maintain an issues log that describes design, installation, and performance issues that are at variance with the Contract Documents. Identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.

1. Creating an Issues Log Entry:

    a. Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.
    b. Assign a descriptive title of the issue.
    c. Identify date and time of the issue.
    d. Identify test number of test being performed at the time of the observation, if applicable, for cross-reference.
    e. Identify system, subsystem, and equipment to which the issue applies.
    f. Identify location of system, subsystem, and equipment.
    g. Include information that may be helpful in diagnosing or evaluating the issue.
    h. Note recommended corrective action.
    i. Identify commissioning team member responsible for corrective action.
    j. Identify expected date of correction.
    k. Identify person documenting the issue.

2. Documenting Issue Resolution:

    a. Log date correction is completed or the issue is resolved.
    b. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.
    c. Identify changes to the Contract Documents that may require action.
    d. State that correction was completed and system, subsystem, and equipment is ready for retest, if applicable.
    e. Identify person(s) who corrected or resolved the issue.
    f. Identify person(s) documenting the issue resolution.

3. Issues Log Report: On a periodic basis, but not less than for each commissioning team meeting, RDP shall prepare a written narrative for review of outstanding issues and a status update of the issues log. As a minimum, RDP shall include the following information in the issues log and expand it in the narrative:

    a. Issue number and title.
    b. Date of the identification of the issue.
    c. Name of the commissioning team member assigned responsibility for resolution.
    d. Expected date of correction.

F. Commissioning Report: RDP shall document results of the commissioning process including unresolved issues and performance of systems, subsystems, and equipment. The commissioning report shall indicate whether systems, subsystems, and equipment have been completed and are performing according to the Contract Documents. The commissioning report shall include, but is not limited to, the following:

1. Lists and explanations of substitutions; compromises; variances in the Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. This report shall be used to evaluate systems, subsystems, and equipment and shall serve as a future reference document during Owner occupancy and operation. It shall describe components and performance that exceed requirements of the Contract Documents. It may also include a recommendation for accepting or rejecting systems, subsystems, and equipment.
2. Commissioning plan.
3. Testing plans and reports.
4. Corrective modification documentation.
5. Issues log.
6. Completed test checklists.

G. Systems Manual: RDP shall gather required information and compile systems manual. Systems manual shall include, but is not limited to, the following:

1. Submittal Data stating equipment installed and selected options for each piece of equipment requiring maintenance.
2. Operation and maintenance data on each piece of equipment requiring maintenance. Required routine maintenance actions shall be clearly identified.
3. Name and address of at least one service agency.
4. Lighting controls system maintenance and calibration information.
5. A narrative of how each system is intended to operate, including recommended setpoints.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 TESTING:

A. Testing shall ensure that the control hardware and software are calibrated, adjusted, programmed and in proper working condition in accordance with the construction documents and manufacturers installation instructions.

B. Testing shall ensure that the lighting controls meet all provisions of the applicable energy

code.

C. Perform tests using design conditions whenever possible. Where occupant sensors, time switches, programmable schedule control, photosensor's or daylighting controls are installed, the following procedures shall be performed:

1. Confirm that the placement, sensitivity and time-out adjustments for occupant sensors yield acceptable performance.
2. Confirm that the time switches and programmable schedule controls are programmed to turn the lights off.
3. Confirm that the placement and sensitivity adjustments for photosensor controls reduce electric light based on the amount of usable daylight in the space as specified.

END OF SECTION

SECTION 26 09 23

LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes time switches, photoelectric relays, occupancy sensors, and multi-pole lighting relays and contactors.

B. Related Sections include the following:

1. Section 26 27 26 - Wiring Devices for wall-box dimmers and manual light switches.

1.3 SUBMITTALS

A. Submit shop drawings and product data, including all wiring diagrams.

PART 2 - PRODUCTS

2.1 GENERAL LIGHTING CONTROL DEVICE REQUIREMENTS

A. Line-Voltage Surge Protection: Include in all 120- and 277-V solid-state equipment. Comply with UL 1449.

2.2 TIME SWITCHES

A. Description: Electromechanical-dial type complying with UL 917.

1. Astronomic dial.
2. Two contacts, rated 30 A at 277-V ac, unless otherwise indicated.
3. Eight-day program uniquely programmable for each weekday and holidays.
4. Skip-day mode.

2.3 LIGHTING CONTROL SYSTEM

A. Description of Work: Extent of lighting control system work is indicated by drawings, and by the requirements of this section. It is defined to include low voltage lighting control panels, switch inputs, and wiring.

1. Type of lighting control equipment and wiring specified in this section include the following: Low Voltage Lighting Control Panels.

B. SYSTEM DESCRIPTION

1. The lighting control system shall consist of low voltage relay control panels with 32 programmable switch inputs and shall offer 32 control relays.
2. Each low voltage lighting control panel shall be microprocessor controlled with an integral 4 x 16 - 64 character display and with a programming keypad.
3. Programmable intelligence shall include Time-Of-Day control, 32 holiday dates, warn occupants of an impending off, timed inputs, preset control, auto daylight savings, astronomical clock w/offsets, and local control.

TOD	64 Time-Of-Day/holiday schedules for 365 day programming
Holidays	32 holiday dates
Warn Off	Flashlights and provide an extra 1 second to 99 minutes of illumination
Preset	Pre-programmed switch patterns
Timed Inputs	Switch input timers 1-999 minutes
Timed Overrides	Timed override 1-999 minutes, resumes to normal schedule
Local Control	From alpha-numeric keypad & local switch
Astronomical	Longitude and latitude input with sunset-sunrise offsets to customize outdoor lighting Clock
Auto Daylight	Automatically adjusts the clock at the appropriate dates, selectable Savings Adjust.
Priorities	Establishes a hierarchy for inputs and network control commands
Masking	Provides permission orientation to switch inputs and network commands thereby ensuring building lighting control integrity.
A. Soft-Linking	Group linking for rapid programming

4. Relays may be designated as either normally open or normally closed from software. Relay status shall not only disclose commanded relay status but next scheduled state to occur.
5. Each control panel shall provide a Warn Off (flash the lights) to inform the occupants of an impending Off command. The Warn Off command shall provide an adjustable time duration of 1 second to 99 extra minutes. The occupants may exit the premises with adequate lighting or cancel the Warn Off by overriding the lighting zone. This option occurs with all Off commands except local overrides.
6. The controller shall permit lighting to be overridden on for after hours use or cleaning. The controller shall provide optional switch timer assignments or timed overrides. The override choices for various relays shall provide special event

occurrences and the controller shall return to the programmed state. Also, the controller shall provide priority and masking choices to customize the functions of switch inputs, thereby enabling switches to function differently at different times of the day to meet special facility operational requirements. These overrides shall be hard-wired inputs.

7. Programming the controller shall be through the local integral keypad. Descriptive information shall assist the user to employ the system without a programming manual.
8. Priorities and/or Masking shall be assigned to inputs, telephone override, and global commands to ensure building integrity. Priorities enable or disable the inputs based on Time-Of-Day scheduling in the controller. Masks shall permit: On only, Off only and On & Off control for intelligent after hours utilization of the controlled facility
9. The lighting control system may be fully programmed through PC programming software. Programming shall be permitted through a direct RS-232 or RS-485 connection, and modem.

C. HARDWARE FEATURES

1. Operator Interface: The control panel programming interface resides in firmware in the control panel. The programming interface shall consist of a circuit board mounted keypad capable of linking switch inputs to relay outputs and schedule assignments. Systems that utilize blocking diode technology for relay assignments shall not be acceptable.
2.
3. The integral keypad shall provide access to the main programming features. The keypad shall permit the user to manually command any or all relays individually. Each panel shall control its own loads from internal memory. A control system that relies on a central control computer/processor or external time clocks shall not be permitted.
4. Contact inputs: The control system shall permit 32 dry contacts (Digital/Switch Inputs) for override purposes. Momentary 3 wire or 2 wire (toggle) inputs shall be supported. Maintained contacts shall be supported as 2 wire (SPST) inputs. Inputs shall be dry contacts (24 VDC @ 12 ma. internally supplied to the inputs). An input shall be software linked to any number of relays for override control.
5. The controller shall provide timers for each switch input. Each switch input timer shall be capable of 0-999 minutes. Software shall enable or disable switch inputs based on Time Of Day scheduling.
6. Relay Type: The system shall utilize control relays which are rated to 20 amps at 277 VAC. The relays shall be magnetically held and are provided in groups of eight. Relays that are latched or mechanically held are not acceptable. The relays shall be rated for 10 million mechanical operations. A limited 10 year warranty shall be provided on the individual relays.
7. Photocell Control: The controller shall accept user adjustable ambient light sensors. The controller shall provide power for the sensor thereby eliminating any external power supply. Sensors shall provide for both outdoor and indoor applications and provide a dry contact to the controller once the threshold is reached. The sensor shall provide user adjustable dead band control.
8. Modular Design: The control system shall employ all modular connectors to avoid repeat wiring in case of component failure. The system CPU board shall be

mounted on quick release hinge pins that shall permit an entire change out of the processor and input board in less than 1 minute.

9. All connections for the switch inputs shall incorporate modular connectors. The relay board shall be modular and designed for rapid field replacement or upgrading. Systems that do not employ modular connectors shall not be acceptable.
10. Hardware Output Options

    a. Latching Relay Card (LRC): The controller shall provide an option for remote placement of the control relays. A modular card shall connect into the relay compartment. Twisted (3) conductor cable shall power and control the remote mounted relays. Maximum distance is 500 feet employing 18 AWG conductor.
    b. Modular Relay Card (MRC): The controller shall provide an option for modular relay control. The Modular Relay Card (MRC) shall offer the feature of controlling two pole voltages such as 208, 240, and 480VAC in a Normally Open or Normally Closed configuration. Single pole is offered for 120 and 277VAC in a Normally Open and Absolute Zero Configuration. This relay card shall also provide visual indication of relay status. Relays shall be individually exchangeable with plug in low voltage connectors. Combinations of relays shall be permitted since relay modules shall snap into and lock in location. Two pole modules require two relay locations for a maximum of four two pole relays per card. All other relay modules use 1 relay location for a maximum of eight per card. All Modular Relay Card components shall be warranted for 10 years.
    c. Two Pole Relay Card (TPRC): The controller shall provide an option for two pole relay control. The Two Pole Relay Card TPRC shall offer the feature of controlling two pole voltages such as 208, 240, and 480 VAC lighting loads at 20 amps. The relays shall be modular in design and offer manual hand override control. This optional relay card shall also provide a visual indication of relay status. The 208, 240 VAC version shall provide 8 relays per card whereas the 480 VAC version shall provide 4 relays per card. Combinations of relays shall be permitted since relays shall snap into location.
    d. Automatic Relay Card (ARC): The system shall utilize hybrid control relays that are rated to 20 amps at 277 VAC. The hybrid relay shall combine a high speed electronic switch with a mechanical relay to create a unique switching device. The hybrid design shall look at each AC phase and shall close the electronic switch precisely at the absolute zero crossing. The mechanical relay in parallel shall follow and close after the in-rush current condition. The relay shall provide an integral switch for both manual hand operation and visual indication of relay status. The relays shall be rated for 10 million mechanical operations. A limited 2 year warranty shall be provided on the individual relays.
    e. Lighted Switch Card (LSC): The controller shall provide an option for pilot light wall switch annunciation. A modular card shall connect into the controller board and shall provide power to illuminate pilot light switches. This option shall confirm relay operation. When a relay is in the "ON" position the pilot light switch shall be illuminated.

11. Diagnostic Aids: Each control panel shall incorporate diagnostic aids for confirmation of proper operation, or in case of failure these aids shall guide the individual in rapid troubleshooting of the system.

The control panels shall employ both a backlit supertwist LCD and LED's that indicates:

- POWER (LED)
- SYSTEM OK (LED)
- NETWORK COMMUNICATIONS (LED)
- ON/OFF STATUS of EACH RELAY (LED & LCD)
- SYSTEM CLOCK and DATE (LCD)
- PROGRAMMING CONFIRMATION (LCD)
  (TOD, HOLIDAY, ON/OFF, & PRESET)

Control systems that do not provide visual self help diagnostics shall not be acceptable.

12. Memory Back-up: The system shall utilize a memory back-up device that is system integrated and shall be non-serviceable. The data in RAM shall be protected against power interruptions lasting as long as 7 days. The power interrupt protection circuit shall be entirely maintenance-free.
13. Multi-tapped Transformer: The control panel shall incorporate the use of a multi-tapped transformer. The panel shall not require specification of voltage for each control location. The voltages of 120 & 277 VAC shall be available with each control panel.
14. Status Indication of Relays: The system shall provide visible status indication of all relays through the window of each control panel. The visual indication shall disclose On/Off status and relay number.
15. Service Override & Priority Override: The control panel shall provide a three position master-service override for the control unit. The service override shall not be accessible from the exterior.

The master service override provides a single three position switch with the option of All Off, Auto, and All On, respectively. This master switch shall operate all of the relays in the controller. This switch shall override and supersede all commands from the logic board when the switch is in the All On or All Off position. The master switch shall function to override all the relays should the logic board programming differ from the space function.

The system shall remember the last command to the individual relays. Upon returning the master override switch to the Auto position, the relays shall return to the most recent command state. This will occur even if the last command happened during the master override condition.

Additionally, the system shall provide external priority override for the entire panel. Through an externally maintained contact the override card shall place the panel in a priority state. This external contact will supersede any other programmed state and will command all the relays ON or OFF depending on operational choice. This priority state will continue until the external contact is removed. Once the external override is removed the control panel will return the relays to the appropriate programmed state.

16. Lockable Enclosure: Each control panel shall be enclosed in a lockable NEMA class 1 enclosure. The enclosure shall be manufactured out of 1/16" steel and shall provide pre-punched knockouts for efficient installation.
17. Panels: The low voltage controller shall exist in two sizes of relay enclosures. The enclosure maximum sizes shall be 32 relays per cabinet. The 16 size will employ two relays cards and the 32 will utilize 4 relay cards. Relays shall be provided in groups of eight relays per card.
18. High Voltage Barriers: The low voltage controller shall provide as an option the ability to provide a barrier for either voltage separation or emergency circuit separation. The 16-size enclosure shall permit one barrier and the 32-size enclosure shall permit up to three locations where the barrier(s) may be installed. The barrier shall be painted red to denote the difference.
19. Modem: The control system shall be capable of modem communications. Each control panel shall provide a serial communications port for external tele-communications. The modem shall utilize the Hayes compatibility standard and enable modem access as defined by the Bell 212A and CCITT V.22 protocol standards.
20. Telephone Overrides (TIM): The control system shall provide intelligent software for the Telephone Interface Module (TIM) option. The optional TIM unit shall allow modem communications and touch tone overrides from any touch tone phone. The control system shall be multi-tasking and permit up to one TIM for each control panel.

Override Operation: Touch-tone interface shall permit the control panel to command pre-assigned control points On\ Off. All user interfaces shall be through the twelve Touch-tone keys on the telephone. All entries into the override system shall be prompted by a digitized voice. Systems not employing voice guided override instruction are not acceptable.

The TIM shall provide individual control passwords. Each password shall allow a preset group designation (number of relays) and the duration of the telephone override. TIM shall also provide a password to prevent entry into the override control system.

21. Software: System provided shall include the manufactures PC based interface software package. The PC based interface software shall provide access to lighting control system files within a Microsoft Windows environment. The software package shall allow individual panel programming to be executed locally, direct connection, Ethernet connection or remotely through a modem. The central programming software shall permit the user to modify the control panel programming or configuration in an "OFF-LINE" mode. This software package shall store all programmed data and archive for future use. Systems using third party software are not acceptable.

The following features shall be standard in the PC based software:

a. Standard Software Features:
   i. Real Time Relay Status Monitoring
   ii. Alpha-Numeric Descriptors
   iii. Communications: Direct, Network, Ethernet and Modem
   iv. Network Status Indication

v. Global Software Modifications
vi. Manual Relay Commands
vii. Remote Pattern Commands
viii. Preset Options

b. File Maintenance
ix. Archive Programs
x. Data Base Restoration
xi. Uploading and Downloading of Programs

Software package shall permit the PC to be utilized for other functions (i.e. word processing, data-base, & etc..) besides lighting control. Systems that require an "on-line" dedicated computer for control system operation shall not be acceptable.

22. PC Interface (RS-232 port): The controller shall permit PC programming through software. The controller shall provide a RJ-12 connection for RS-232 programming. Programming shall be permitted through either a local connection or remotely through a modem. PC software shall permit multiple file storage for data archival and for seasonal facility requirements. Operator commands may be issued directly from the PC keyboard.

D. MANUFACTURERS

1. Cooper Controls, Greengate
2. Lutron
3. Lighting Control & Design
4. Lightolier

2.4 PRODUCT SUPPORT AND SERVICE

1. Factory Support: Factory telephone support shall be available at no cost to the owner. Factory assistance shall consist of solving programming or application questions concerning the control equipment.

2.5 WARRANTY

1. Manufacturer shall supply a 2 year warranty on all hardware and software. A limited 10 year warranty shall be provided on the standard relay card.

2.6 PHOTOELECTRIC RELAYS

A. Description: Solid state, with single-pole, double-throw dry contacts rated to operate connected relay or contactor coils or microprocessor input, and complying with UL 773A.

B. Light-Level Monitoring Range: 0 to 3500 fc, with an adjustment for turn-on/turn-off levels.

C. Time Delay: Prevents false operation.

D. Outdoor Sealed Units: Weather tight housing, resistant to high temperatures and

equipped with sun-glare shield and ice preventer.

2.7 OCCUPANCY SENSORS

A. Occupancy sensors indicated on the plans are to establish room controls and sensor quantities. The contractor is to verify sensor placement with the local manufacturer's representative or the manufacture to ensure proper coverage and functionally of the specific sensor(s) installed. The contractor is to return and make any adjustments necessary to the occupancy sensor settings and/or placement needed to maintain proper functionality within 30 days after the owner/tenant takes occupancy of the project.

B. Lighting control system shall include all occupancy sensors, power packs, and control wiring required to form a complete system.

C. All occupancy sensors shall be dual/multi technology, manufactured by Unenco, Wattstopper, Lightolier Controls, Sensor Switch, or pre-approved equal unless otherwise noted.

D. Ceiling and Wall Mount Units: Shall utilize dual/multi technology detection methods. Unit receives control power from a separately mounted auxiliary power and control unit, and operates power switching contacts in that unit.

E. Switch-Box-Mounting Units: Shall utilize dual/multi technology detection methods. Unit receives power directly from switch leg of the 120- or 277-V ac circuit it controls and operates integral power switching contacts. Unit is to have integral manual controls and is to be mounted at standard switch height.

F. Operation: Turns lights on when room or covered area is occupied and off when unoccupied, unless otherwise indicated.

1. Time Delay for Turning Lights Off: Adjustable over a range from 1 to 20 minutes, minimum. Time delay to be set at 20 minutes unless otherwise directed. Contractor shall verify time delay with the owner/tenant prior to final occupancy.
2. Manual Override Switch: Where indicated on drawings; turns lights off manually regardless of elapsed time delay.
3. Sensor shall be located and/or adjusted to detect occupancy within 1-foot of entry into room or area controlled by the occupancy sensor.

G. Auxiliary Power and Control Units: As follows:

1. Relays rated for a minimum of 20-A normal ballast load.
2. Sensor Power Supply: Rated to supply the number of connected sensors.
3. Relays shall have an auxiliary contact(s) for integration with HVAC or other building control systems.

H. Passive-Infrared Type: Detects occupancy by a combination of heat and movement in zone of coverage.

I. Ultrasonic Type: Emits a beam of ultrasonic energy and detects occupancy through use of Doppler's principle in discerning movement in zone of coverage by sensing a change in pattern of reflected ultrasonic energy. Ultrasonic frequency shall be 25 Khz or greater

and sensor shall be temperature and humidity resistant.

J. Dual-Technology Type: Uses a combination of passive-infrared and ultrasonic or microphonic detection methods to distinguish between occupied and unoccupied conditions for area covered. Particular technology or combination of technologies that controls each function (ON or OFF) is selectable in the field by operating controls on unit.

K. All sensors shall be capable of operating normally with electronic ballast and compact fluorescent systems.

L. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.

M. All sensors shall have readily accessible, user adjustable controls for time delay and sensitivity. Controls shall be recessed to limit tampering.

N. In the event of failure, a bypass manual “override on” feature shall be provided on each sensor. When bypass is utilized, lighting shall remain on constantly. The override feature shall be designed for use by building maintenance personnel and shall not be readily accessible by building occupants.

O. All sensors shall provide an LED indication light to verify that motion is being detected and that the unit is working.

P. All sensors shall have no leakage current in OFF mode and shall have voltage drop protection.

2.8 MULTIPOLE CONTACTORS AND RELAYS

A. Description: Electrically operated and mechanically held, and complying with UL 508 and NEMA ICS 2.

1. Current Rating for Switching: UL listing or rating consistent with type of load served.
2. Control Coil Voltage: Match control power source.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install equipment level and plumb and according to manufacturer's written instructions.

3.2 CONTROL WIRING INSTALLATION

A. Install wiring between sensing and control devices according to manufacturer's written instructions.

B. Wiring Method: Install all wiring in raceways.

C. Bundle, train, and support wiring in enclosures.

D. Ground equipment.

E. Connections: Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.3 IDENTIFICATION

A. Provide Brady wire markers or equivalent on all conductors.

3.4 FIELD QUALITY CONTROL

A. Inspect control components for defects and physical damage.

B. Verify settings of photoelectric devices with photometer.

C. Electrical Tests: Use particular caution when testing devices containing solid-state components. Perform the following according to manufacturer's written instructions:

1. Continuity tests of circuits.
2. Operational Tests: Set and operate devices to demonstrate their functions and capabilities in a methodical sequence that cues and reproduces actual operating functions.

D. Correct deficiencies, make necessary adjustments, and retest. Verify that specified requirements are met.

E. The Lighting Control Panel shall be tested and listed under the UL 906 Energy Management Equipment Standards.

3.5 CLEANING

A. Cleaning: Clean equipment and devices internally and externally using methods and materials recommended by manufacturers, and repair damaged finishes.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes load centers and panelboards, overcurrent protective devices, and associated auxiliary equipment rated 600 V and less for the following types:

1. Lighting and appliance branch-circuit panelboards.
2. Distribution panelboards.

B. Related sections:

1. Section 26 05 01 - Field Test and Operational Check.
2. Section 26 05 26 - Grounding.

1.3 SUBMITTALS

A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:
    a. Enclosure types and details for types other than NEMA 250, Type 1.
    b. Bus configuration, current, and voltage ratings.
    c. Short-circuit current rating of panelboards and overcurrent protective devices.
    d. UL listing for series rating of installed devices.
    e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

C. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

D. Maintenance Data: For panelboards and components, include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the NEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NEMA PB 1.

C. Comply with the NEC.

1.5 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:

1. Panelboards, Overcurrent Protective Devices and Accessories:

a. Eaton Corp.; Cutler-Hammer Products.
b. General Electric Co.; Electrical Distribution & Control Div.
c. Siemens
d. Square D Co.; Schneider Electric Brands
e. Or approved equal.

2.2 FABRICATION AND FEATURES

A. Enclosures: Flush or surface mounted cabinets (as indicated on drawings). Construct cabinets with code gauge galvanized steel. Provide minimum 20” wide cabinets and extra wiring space where incoming feed-through or parallel lines are shown. NEMA PB 1, Type 1, to meet environmental conditions at installed location.

1. Outdoor Locations: NEMA 250, Type 3R.
2. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
4. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.

B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.

C. Doors: Provide door-in-door construction, made of cold-rolled steel. Inner door shall provide access to breaker handles and outer door shall provide access to wiring space as well. Inner door shall be completely flush with no visible bolts, screw-heads or hinges and with flush catch and lock. Outer door shall have concealed hinges, flush catch and lock to match inner door, located in line with inner door catch. (Tee bar handles are not acceptable).

D. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.

E. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.

F. Bus: Hard-drawn copper, 98 percent conductivity. Attach circuit breakers to bus so that circuits 1, 3, and 5; 2, 4, and 6, or any three similarly numbered circuits form one three-phase, four-wire circuit.

G. Main and Neutral Lugs: Compression or mechanical type suitable for use with conductor material.

H. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.

I. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.

J. Isolated Equipment Ground Bus: Where indicated on drawings - Adequate for branch-circuit equipment ground conductors; insulated from box.

K. Extra-Capacity Neutral Bus: Where indicated on drawings, neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads. Where indicated on plans, On 120/208Y Panels fed by K factor Type Transformer.

L. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor. Where indicated on plans.

M. Gutter Barrier: Arrange to isolate individual panel sections.

N. Feed-through Lugs: Compression or mechanical type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device. For two-section panels.

O. Panels located adjacent to each other shall have identically sized enclosures and trims.

2.3 PANELBOARD SHORT-CIRCUIT RATING

A. UL label indicating series-connected rating with integral or remote upstream devices. Include size and type of upstream device allowable, branch devices allowable, and UL series-connected short-circuit rating. If not series rated: Fully rated to interrupt symmetrical short-circuit current available at terminals or the rating indicated on the plans, whichever is higher.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Branch Overcurrent Protective Devices:

1. 120/208Y volt branch circuit panelboards: Quick-make, quick-break, molded case plug-in type designed for 120/208Y volt, three-phase, four-wire service with minimum 10,000 amperes rms short circuit rating.
2. 277/480Y volt branch circuit panelboards: Molded case bolt-on type designed for 277/480Y volt, three-phase, four-wire service with minimum 14,000 amperes rms short circuit rating.
3. Provide multi-pole units with common trip elements.
4. Breaker shall have center-tripped position in addition to the ON and OFF positions.
5. Provide lockouts for all circuits that should not be inadvertently tripped (as indicated on the drawings).

2.5 DISTRIBUTION PANELBOARDS

A. Dead-front, dead-rear, Nema 1 or 3R enclosure as indicated, designed for use on a three-phase, four-wire, 120/208Y or 277/480Y volt system. See drawings for additional details.

B. Construction: Code gauge galvanized steel fully flanged for strength and rigidity. Door and trim shall be cold-rolled steel, code gauge. Provide concealed butt hinges and 3-point catch and lock. Provide separately hinged or bolted vertical access doors over lug and wiring spaces.

C. Bus Bars: Panel shall be fully bussed. Shall be used throughout and shall be hard-rolled, electrolytic copper of 98% conductivity designed for a maximum 1000 amperes per square inch. Bars shall be factory pre-drilled to accept future field installation of 2 or 3 pole circuit breakers in any combination. Brace all bus bars for required short circuit rating of the panel, but in no case less than 35,000 amperes rms, Refer to Short Circuit information above for additional requirements.

D. Main Overcurrent Protective Devices: Circuit breaker unless otherwise noted.

E. Provide handle locking devices for all circuit breakers.

F. Provide engraved nameplates with minimum ¼" high letters secured to panel front and for each circuit protective device in panel.

2.6 OVERCURRENT PROTECTIVE DEVICES

A. Main Breaker (or Feeder) Assemblies rated for 1200 Amps:

1. Main (or feeder) breakers rated for 1200 Amp may be Molded Case with temperature insensitive, solid state trips, current sensors and solid state logic circuit integral with the frame. All circuit breakers shall be of same design for over-current and ground fault trip coordination. The Circuit breakers shall have the following features:

    a. UL listed for 80 percent load application unless otherwise indicated on plans as 100% rated.
    b. Adjustable [L] Long time time-delay and ampere setting.
    c. Adjustable [S] Short time-delay and pick-up.
    d. Adjustable [I] Instantaneous trip.
    e. <u>For 277/480Y systems rated 1000 Amp or higher</u> - Adjustable [G] Ground fault pick-up and delay is required.
    f. Adjustable [G] Ground fault pick-up and delay where indicated or required be NEC.
    g. Adjustable [R] Reduced Entergy Let-Through (RELT) Instantaneous trip. This feature shall be provided on breakers to provide a temporary setting for the instantaneous trip setting of the breaker. Setting shall be adjustable down to 1.5X of the rating plug and shall be enabled through a switch mounted on front of the switchboard. The switch shall be combined with an indicating light that positively indicates that the RELT is enabled or disabled.
    h. Where Indicated special zone control interlocking for main breaker and future main and tie breaker of double-ended substation switchboard.
    i. Short circuit, overload and ground fault trip indicators.

B. Feeder Circuit Breaker Assemblies 400 Amps or larger:

1. Feeder Circuit breakers 400 Amps or larger shall be digital solid state true RMS sensing Molded Case Circuit Breakers with temperature insensitive, solid state trips, current sensors and solid state logic circuit integral with the frame. All circuit

breakers shall be of same design for over-current and ground fault trip coordination. The Circuit Breakers shall have the following minimum features:

a. UL listed for 80 percent load application unless otherwise indicated on plans.
b. Long time pickup (ampere setting) determined by interchangeable rating plug .
c. Adjustable instantaneous with short time tracking function.
d. Circuit Breaker shall allow the UL listed field installation internal accessories (Auxiliary Switch, Shunt Trip, Undervoltage release, Bell Alarm Switch) without removal of cover to install. Circuit Breaker shall include Accessories as indicated on plans.
e. Circuit breaker handle accessories shall provide provisions for locking handle in the 'ON' or 'OFF' position

2. Where specifically indicated or required by NEC

a. Adjustable [L] Long time time-delay and ampere setting.
b. Adjustable [S] Short time-delay and pick-up.
c. Adjustable [I] Instantaneous trip.
d. Adjustable [G] Ground fault pick-up and delay where indicated or required be NEC.
e. Where Indicated special zone control interlocking for main breaker and future main and tie breaker of double-ended substation switchboard
f. Short circuit, overload and ground fault trip indicators.
g. Trip device of circuit breakers shall be of same type for tripping coordination.

C. Feeder Circuit Breaker Assemblies 150 Amp and below:

1. Feeder Circuit breakers 150 Amp and below shall be thermal Magnetic Circuit breaker: Inverse time current element for low level overloads, and instantaneous magnetic trip element for short circuits, unless otherwise indicated or required to meet Section 2.4 C above. Minimum features below:

a. UL listed for 80 percent load application unless otherwise indicated on plans.
b. Circuit Breaker shall allow the UL listed field installation internal accessories (Auxiliary Switch, Shunt Trip, Undervoltage release, Bell Alarm Switch) without removal of cover to install. Circuit Breaker shall include Accessories as indicated on plans.
c. Circuit breaker handle accessories shall provide provisions for locking handle in the 'ON' or 'OFF' position

2. Where specifically indicated or required by NEC

a. Adjustable [L] Long time time-delay and ampere setting with Long time pickup (ampere setting) determined by interchangeable rating plug.
b. Adjustable [S] Short time-delay and pick-up.
c. Adjustable [I] Instantaneous trip.
d. Adjustable [G] Ground fault pick-up and delay where indicated or required be NEC.
e. Where Indicated special zone control interlocking for main breaker and future main and tie breaker of double-ended substation switchboard
f. Short circuit, overload and ground fault trip indicators.
h. Trip device of circuit breakers shall be of same type for tripping coordination.

D. General Breaker Requirements:

1. Minimum interrupting capacity shall match the minimum required interrupt rating of the panel.
2. Standard frame sizes, trip ratings, and number of poles.
3. Lugs: Mechanical or compression style, suitable for number, size, trip ratings, and material of conductors.
4. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
5. GFCI Circuit Breakers: Single- and two-pole configurations with 5-mA trip sensitivity.
6. Shunt Trip: 120-V trip coil energized from separate circuit.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Clearances: Minimum code required clearances around panelboards must be maintained.

C. Mounting Heights: Top of trim 78 inches above finished floor, unless otherwise indicated.

D. Mounting: Plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.

E. Mounting Hardware: Provide all necessary blocking, channels and other hardware for securing panelboards to wall, column or other parts of building structure.

F. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

G. Install filler plates in unused spaces.

H. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components.

B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws. Label shall include panel designation, voltage and phase in minimum ¼” high letters.

3.3 CONNECTIONS

A. Install equipment grounding connections for panelboards with ground continuity to main electrical ground bus.

B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.4 FIELD QUALITY CONTROL

A. Testing: Refer to Section 26 05 01 – Field Test and Operational Check.

B. After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements

1. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

C. Balancing Loads: After Substantial Completion, measure load balancing and make circuit changes as follows:

1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.5 ADJUSTING

A. Set field-adjustable switches and circuit breaker trip ranges.

B. Adjust all operating mechanisms for free mechanical movement.

3.6 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes receptacles, switches, and finish plates.

1.3 DEFINITIONS

A. GFCI: Ground-fault circuit interrupter.

B. TVSS: Transient voltage surge suppressor.

1.4 SUBMITTALS

A. Submit shop drawings and product data.

1.5 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:

B. Wiring Devices:

1. Bryant; Hubbell, Inc.
2. GE Company; GE Wiring Devices.
3. Hubbell Wiring Device – Kellems
4. Leviton Manufacturing Co., Inc.
5. Pass & Seymour/Legrand; Wiring Devices Div.
6. Cooper Wiring Devices
7. Or approved equal.

C. Wiring Devices for Hazardous (Classified) Locations:

1. Crouse-Hinds Electrical Co.; Distribution Equipment Div. or approved equal.

D. Multi-outlet Assemblies:

1. Wiremold.
2. Hubbell, Inc.; Wiring Devices Div.
3. Or approved equal.

2.2 RECEPTACLES

A. General Requirements for All Devices:

B. Each device shall have an amperage rating not less than that of the branch circuit(s) overcurrent protection device. White color, unless noted otherwise.

C. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. All devices shall be Commercial Specification Grade (Construction specification grade is prohibited), unless noted otherwise.

E. All Convenience Receptacles, shall be Heavy-Duty 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; 5362 Series or similar

F. All devices in Hospitals and all patient care areas within non-hospital buildings shall be Hospital Grade.

G. Hospital-Grade, Heavy Duty, Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; 8300 Series or similar

H. Straight-Blade: All devices shall be Tamper Resistant where required by the National Electric Code and/or local amendments.

I. Tamper Resistant—Convenience Receptacles: 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; HBL5362xxTR Series or similar.

J. Tamper Resistant—Convenience Receptacles: 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; HBL5362xxTR Series or similar.

K. GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter. Provide one device for each location, daisy-chaining devices to achieve GFCI protection is not approved for this project.

L. Duplex GFCI Convenience Receptacles, 125 V, 20 A.

M. Straight Blade, non-feed through type.

N. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.

O. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.

P. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems;

GFRST20xx Series or similar.

Q. Isolated-Ground Receptacles: Equipment grounding contacts connected only to the green grounding screw terminal of the device with inherent electrical isolation from mounting strap, orange plastic face.

R. General Description: Straight Blade, 125 V, 20 A, Configuration 5-20R. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 1449, and FS W-C-596, with integral TVSS in line to ground, line to neutral, and neutral to ground.

S. TVSS Components: Multiple metal-oxide varistors; with a nominal clamp-level rating of 400 V and minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.

T. Active TVSS Indication: Visual and audible, with light visible in face of device to indicate device is "active" or "no longer in service.

U. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; HBL5362SA Series or similar.

V. Devices: Listed and labeled as isolated-ground receptacles.

W. Isolation Method: Integral to receptacle construction and not dependent on removable parts.

X. TVSS Receptacles: Duplex type, NEMA WD 6, with integral TVSS in line to ground, line to neutral, and neutral to ground, blue plastic face.

Y. General Description: Straight Blade, 125 V, 20 A, Configuration 5-20R. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 1449, and FS W-C-596, with integral TVSS in line to ground, line to neutral, and neutral to ground.

Z. TVSS Components: Multiple metal-oxide varistors; with a nominal clamp-level rating of 400 V and minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.

AA. Active TVSS Indication: Visual and audible, with light visible in face of device to indicate device is "active" or "no longer in service."

BB. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; HBL5362SA Series or similar.

CC. Mulit-Outlet assemblies: Metal with White color finish.

DD. Two-piece surface (painted steel, brushed aluminum) raceway, with factory-wired multi-outlet harness.

EE. Components shall be products from single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.

FF. Receptacles: 20 A, 125-V, NEMA WD 6 Configuration 5-20R receptacles complying with NEMA WD 1, UL 498, and FS W-C-596.

GG. Receptacle Spacing: [6 inches (150 mm)] [9 inches (230 mm)] [12 inches (300 mm)] [18 inches (460 mm)].

HH. Wiring: No. 12 AWG solid, Type THHN copper, [single circuit] [two circuit, connecting alternating receptacles].

2.3 SWITCHES

A. Snap Switches: General-duty, quiet type, rated 20 amperes, 120/277 volts AC. Handle: white plastic. Pilot light type (where indicated): lighted handle.

B. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on/off switches and audible and electromagnetic noise filters.

C. Control: Continuously adjustable slide. Single-pole or three-way switch to suit connections.

D. Incandescent Lamp Dimmers: Modular, 120 V, 60 Hz with continuously adjustable slide; single pole with soft tap or other quiet switch; electromagnetic filter to eliminate noise, RF, and TV interference; and 5-inch wire connecting leads.

E. Fluorescent Lamp Dimmers: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming to a maximum of 1 percent of full brightness.

2.4 WALL PLATES

A. Single and combination types match corresponding wiring devices.

1. Cover plate: Smooth white plastic.
2. Cover plate for surface mounted devices: Galvanized steel.
3. Weatherproof cover plate: While in use, gasketed, cast metal, hinged device covers.
4. Plate-Securing Screws: Metal with head color to match plate finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices and assemblies plumb and secure.

B. Install wall plates when painting is complete.

C. Install wall dimmers to achieve indicated rating after derating for ganging as instructed by manufacturer.

D. Do not share neutral conductor on load side of dimmers.

E. Arrangement of Devices: Unless otherwise indicated, mount flush, vertically, with height as indicated or six inches above counters.

F. Group adjacent switches under single, multigang wall plates.

G. Protect devices and assemblies during painting.

H. Install wall switches with off position down.

I. Install cover plates on switch, receptacle, and blank outlets.

3.2 IDENTIFICATION

A. Switches and receptacles: Identify panelboard and circuit number from which served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on the outside of the face plate for receptacles and on the inside of the face plate for switches; utilize durable wire markers or tags within all outlet boxes. Labels shall be Brother ½" TZ tape, black ink on clear, extra-strength adhesive tape, with size 18 text or engineer approved equal. Use matching label printer.

3.3 CONNECTIONS

A. Connect wiring device grounding terminal to outlet box with bonding jumper.

B. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor.

C. Isolated-Ground Receptacles: Connect to isolated-ground conductor routed to designated isolated equipment ground terminal of electrical system.

D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.4 FIELD QUALITY CONTROL

A. Test wiring devices for proper polarity and ground continuity. Check each device to verify operation.

B. Test GFCI operation according to manufacturer's written instructions.

C. Replace damaged or defective components.

3.5 CLEANING

A. Internally clean devices, device outlet boxes, and enclosures. Replace stained or improperly painted wall plates or devices.

END OF SECTION

SECTION 26 28 15

DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 WORK INCLUDED

A. Provide and install motor disconnects.

B. Provide and install circuit disconnects.

1.3 REFERENCES

A. Underwriters' Laboratory, Inc. - Annual Product Directories.

B. NEMA - Classification of Standard Types of Nonventilated Enclosures for Electric Controllers.

1.4 REGULATORY REQUIREMENTS

A. Conform to National Electrical Code and to applicable inspection authority.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Cutler-Hammer/Westinghouse, General Electric, Siemens, Square D, or approved equal.

2.2 COMPONENTS

A. Motor and circuit disconnects shall have an Underwriters' Laboratory label.

B. Single Phase 120 Volt Disconnect Switches: Single pole toggle switch with thermal overload motor protection where indicated. A Horse Power rated switch may be used where fractional horse power motors have internal overload protection.

C. Single or Three Phase Motor Disconnect Switches: two or three pole heavy duty or fusible where other loads are on same circuit, 250 or 600 volt as required in NEMA Type 1, 3R, or 4 enclosures designed to reject all except Class 'R' fuses.

2.3 ACCEPTABLE MANUFACTURERS - FUSES

A. Cooper Bussmann, Edison, Littelfuse, Ferraz Shawmut, or approved equal.

2.4 FUSES

A. As indicated on the drawings. All shall be of the same manufacturer. Provide one spare set of fuses (minimum of three) for each current rating and type used. See Section 26 28 13.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install motor and circuit disconnect as indicated on Drawings and as required by Code. Where fuses are indicated, provide fuses correlated with full load current of motors provided.

END OF SECTION

SECTION 26 51 00

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes interior lighting fixtures, lighting fixtures mounted on exterior building surfaces and recessed in canopies, lamps, ballasts, emergency lighting units, and accessories.

B. Related Sections include the following:

1. Section 26 09 23 Lighting Control Devices.

1.3 SUBMITTALS

A. Product Data: For each type of lighting fixture indicated, arranged in order of fixture designation. Include data on features and accessories.

B. Maintenance data for lighting fixtures.

C. Emergency lighting units including battery and charger.

1.4 QUALITY ASSURANCE

A. Fixtures, Emergency Lighting Units, and Accessories: Listed and labeled as defined in the NEC, Article 100, by a testing agency acceptable to authorities having jurisdiction.

B. Comply with the NEC.

C. FM Compliance: Fixtures for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM.

D. NFPA 101 Compliance: Comply with visibility and luminance requirements for exit signs.

1.5 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, partition assemblies, and other construction.

1.6 WARRANTY

A. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Emergency Lighting Unit Batteries: Five years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining four years.

B. Special Warranty for Ballasts: Manufacturer's standard form in which ballast manufacturer agrees to repair or replace ballasts that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Electronic Ballasts: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: As indicated on the drawings.

2.2 FIXTURES AND FIXTURE COMPONENTS, GENERAL

A. Metal Parts: Free from burrs, sharp corners, and edges.

B. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

D. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or annealed crystal glass, unless otherwise indicated.

1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.
2. Lens Thickness: 0.125 inch minimum, unless greater thickness is indicated.

2.3 FLUORESCENT LAMP BALLASTS

A. General Requirements: Unless otherwise indicated, features include the following:

1. Designed for type and quantity of lamps indicated at full light output.
2. Total Harmonic Distortion Rating: Less than 10 percent.
3. Sound Rating: A.

B. Electronic Ballasts for Linear Lamps: Unless otherwise indicated, features include the following, besides those in "General Requirements" Paragraph above:

1. Certified Ballast Manufacturer Certification: Indicated by label.
2. Parallel Lamp Circuits: Multiple lamp ballasts connected to maintain full light output on surviving lamps if one or more lamps fail.

C. Electromagnetic Ballasts for Linear Lamps: Unless otherwise indicated, features include the following, besides those in "General Requirements" Paragraph above:

1. Type: Energy saving.
2. Certified Ballast Manufacturer Certification: Indicated by label.

D. Ballasts for Compact Lamps: Electronic programmed start type, complying with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated:

1. Lamp end-of-life detection and shutdown circuit.
2. Automatic lamp starting after lamp replacement.
3. Sound Rating: A.
4. Total Harmonic Distortion Rating: Less than 20 percent.
5. Transient Voltage Protection: IEEE C62.41, Category A or better.
6. Operating Frequency: 20 kHz or higher.
7. Lamp Current Crest Factor: 1.7 or less.
8. BF: 0.95 or higher, unless otherwise indicated.
9. Power Factor: 0.95 or higher.
10. Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.
11. Ballast Case Temperature: 75 deg C, maximum.

E. Ballasts for Dimmer-Controlled Fixtures: Comply with general and fixture-related requirements above for electronic ballasts.

1. Compatibility: Certified by manufacturer for use with specific dimming system indicated for use with each dimming ballast.

F. Ballasts for Low-Temperature Environments: As follows:

1. Temperatures 0 Deg F (Minus 17 Deg C) and Higher: Electronic type rated for 0 deg F (minus 17 deg C) starting and operating temperature with indicated lamp types.
2. Temperatures Minus 20 Deg F (Minus 29 Deg C) and Higher: Electromagnetic type designed for use with indicated lamp types.

2.4 HIGH-INTENSITY-DISCHARGE LAMP BALLASTS

A. Electromagnetic Ballast for Metal-Halide Lamps: Comply with ANSI C82.4 and UL 1029. Include the following features, unless otherwise indicated:

1. Type: Constant wattage autotransformer or regulating high-power-factor type, unless otherwise indicated.
2. Operating Voltage: Match system voltage.
3. Minimum Starting Temperature: Minus 22 deg F for single lamp ballasts.
4. Normal Ambient Operating Temperature: 104 deg F.
5. Open-circuit operation that will not reduce average life.

B. High-Pressure Sodium Ballasts: Electromagnetic type, with solid-state igniter/starter. Igniter-starter shall have an average life in pulsing mode of 10,000 hours at an igniter/starter-case temperature of 90 deg C

1. Minimum Starting Temperature: Minus 40 deg F (Minus 40 deg C).
2. Open-circuit operation shall not reduce average lamp life..

2.5 EXIT SIGNS

A. General Requirements: Comply with UL 924 and the following:

1. Sign Colors and Lettering Size: Comply with authorities having jurisdiction.

B. Internally Lighted Signs: As follows:

1. Lamps for AC Operation: Light-emitting diodes, 70,000 hours minimum rated lamp life.

C. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

1. Battery: Sealed, maintenance-free, nickel-cadmium type.
2. Charger: Fully automatic, solid-state type with sealed transfer relay.
3. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
6. Remote Test – Where indicated on the drawings: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
7. Integral Self-Test – Where indicated on the drawings: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

2.6 EMERGENCY LIGHTING UNITS

A. Internal Type: Self-contained, modular, battery-inverter unit, factory mounted within lighting fixture body and compatible with ballast. Comply with UL 924.

1. Emergency Connection: Operate 1 fluorescent lamp continuously at an output of 1100 lumens for 90 minutes. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
2. Test Push Button and Indicator Light: Visible and accessible without opening fixture or entering ceiling space. Provide integral to fixture or mounted adjacent to fixture.

    a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

3. Battery: Sealed, maintenance-free, nickel-cadmium type.
4. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
5. Battery: Sealed, maintenance-free, nickel-cadmium type.
6. Charger: Fully automatic, solid-state type with sealed transfer relay.
7. Night-Light Connection: Where night-light option is called out in the drawings, operate one fluorescent lamp continuously.

B. External Type: Self-contained, modular, battery-inverter unit, suitable for powering one or more fluorescent lamps, remote mounted from lighting fixture. Comply with UL 924.

1. Emergency Connection: Operate 1 or 2 fluorescent lamps continuously at an output of 1100 lumens for 90 minutes. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
2. Battery: Sealed, maintenance-free, nickel-cadmium type.
3. Charger: Fully automatic, solid-state, constant-current type.
4. Housing: NEMA 250, Type 1 enclosure.
5. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
6. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

C. Cold weather Compact Fluorescent: Self-contained, modular, battery-inverter unit, suitable for powering one or more fluorescent lamps, integral or remote mounted from lighting fixture. Comply with UL 924.

1. Emergency Connection: Operate 1 or two fluorescent lamps continuously at a minimum output of 1100 lumens for 90 minutes. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
2. Battery: Sealed, maintenance-free, nickel-cadmium type.
3. Charger: Fully automatic, solid-state, constant-current type.
4. Housing: NEMA 250, Type 1 enclosure for remote-mounted.
5. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
6. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
7. Operating Temperature Range: -20° C to +55° C (-4° F to +131° F)
8. Ballasts shall be equivalent to or exceed performance as follows:

    a. Outdoor Compact Fluorescent Fixtures: Bodine B4CF1 or B4CF2
    b. Outdoor Linear Fluorescent Fixtures: Bodine B50 Cold-Pak

2.7 LAMPS

A. Fluorescent Color Temperature and Minimum Color-Rendering Index: 3500 K and 85 CRI, unless otherwise indicated.

B. Non-compact fluorescent Lamp Life: Minimum rated average is 20,000 hours at 3 hours per start.

C. Compact fluorescent Lamp Life: Minimum rated average is 12,000 hours at 3 hours per start.

D. Metal-Halide Color Temperature and Minimum Color-Rendering Index: 3700 K and 65 CRI, unless otherwise indicated.

E. Horizontally mounted Metal-Halide lamps shall be Venture Lamps series H-75 lamps.

2.8 FIXTURE SUPPORT COMPONENTS

A. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.

B. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy arranged to mount a single fixture. Finish same as fixture.

C. Rod Hangers: 3/16-inch- minimum diameter, cadmium-plated, threaded steel rod.

D. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

E. Aircraft Cable Support: Use cable, anchorages, and intermediate supports recommended by fixture manufacturer.

F. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm)

2.9 FINISHES

A. Fixtures: Manufacturer's standard, unless otherwise indicated.

1. Paint Finish: Applied over corrosion-resistant treatment or primer, free of defects.
2. Metallic Finish: Corrosion resistant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fixtures: Set level, plumb, and square with ceiling and walls, and secure according to manufacturer's written instructions and approved submittal materials. Install lamps in each fixture.

B. Furnish and install a protective barrier around fixtures that are not insulation-contact-rated (non-IC-rated) in locations where insulation is installed. The protective barrier shall be installed to yield a 4” air-gap from the fixture on all sides and top.

C. Support for Fixtures in or on Grid-Type Suspended Ceilings: Attach supports to building structure.

1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches from fixture corners.
2. Support Clips: Fasten to fixtures and to ceiling grid members at or near each fixture corner.
3. Fixtures of Sizes Less Than Ceiling Grid: Arrange as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.

D. Suspended Fixture Support: As follows:

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Suspend from cable installed according to fixture manufacturer's written instructions and details on Drawings.

3.2 CONNECTIONS

A. Ground equipment.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.3 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Tests: As follows:

1. Verify normal operation of each fixture after installation.
2. Emergency Lighting: Interrupt electrical supply to demonstrate proper operation.

C. Malfunctioning Fixtures and Components: Replace or repair, then retest. Repeat procedure until units operate properly.

D. Ballasts: Replace all noisy ballasts. Ballasts that can be heard shall be considered noisy. Repeat the procedure until a ballast is installed that is not noisy.

3.4 CLEANING AND ADJUSTING

A. Clean fixtures internally and externally after installation. Use methods and materials recommended by manufacturer.

B. Adjust aimable fixtures to provide required light intensities.

END OF SECTION

SECTION 27 11 01

TELECOM RACEWAY SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes telecom raceway systems.

1.3 RELATED WORK

A. Section 26 05 33 – Raceways and Boxes.

B. Section 26 05 36 – Cable Trays.

1.4 SYSTEM DESCRIPTION

A. Conduit, cable trays and boxes to form an empty raceway system.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Conduit: Refer to Section 26 05 33.

B. Cable trays: Refer to Section 26 05 36.

C. Outlet, pull or junction boxes: Refer to Section 26 05 33.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide pullboxes in telecom conduit runs spaced less than 100 feet apart, and on the backboard side of runs with more than two right angle bends.

B. Place telecom label on pull and junction boxes.

C. Provide pullwire in each telecom conduit run.

END OF SECTION

SECTION 27 15 00

COMMUNICATIONS CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SCOPE OF WORK

A. The Contractor shall furnish and install all materials for a complete, functional data and voice communications system in accordance with this specification and the contract drawing. Contractor shall be responsible for providing a complete, functional system including all necessary components, whether included in this specification or not.

B. The installation shall include all cable and raceway (twisted-pair copper and fiber optical cabling), conduit raceway, innerduct, interconnect-patching equipment, connectors, and jumpers, wiring blocks and telecommunications outlets. There will be two types of installation – 1) UTP installed in surface mount raceway (approved only in unfinished areas), and 2) UTP installed in conduit and boxes within walls or above ceilings. Multiple drops in a single box within wall will be fed by one vertical raceway with raceway sized to accommodate the required cabling – see building drawings for additional information.

C. In addition to material and equipment, Contractor shall provide labor and any incidental material required for installation. All copper station cables shall be terminated on patch panels at distribution frames and on data communication outlets at the workstation end, all fiber optical cables shall be terminated on rack mounted light interface units (LIU).

D. The owner and user, upon completion of the project, shall furnish all active equipment unless specifically noted on drawings and within specifications.

E. Upon completion of installation, Contractor shall test all copper and fiber optical and record the test results in a test results binder and deliver to owner.

F. The work performed under this specification shall be of good quality and performed in a workmanlike manner. In this context “good quality” means the work shall meet industry technical standards and quality of appearance. The owner reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

G. Voice and data cabling and outlets for pay phones, fax machines, modems, wall telephones, and fire alarm communicators, including Fire Alarm Communicator testing, shall be provided by Contractor.

H. Cable shall be routed as close as possible to the ceiling, floor, or corners to ensure that adequate backboard space is available for current and future equipment and for cable terminations. Cables shall not be tie-wrapped to electrical conduit, ceiling grid wire or other equipment. Minimum bend radius shall be observed. Cable transitions between plenum and non-plenum spaces, through drop ceilings (between horizontal and vertical

risers), and through walls shall be routed through appropriately sized cable sleeves.

1.3 SUMMARY

A. Section Includes:

1. Pathways.
2. UTP cable.
3. Optical fiber cabling.
4. Cable connecting hardware, patch panels, and cross-connects.
5. Cabling identification products. B. Related Sections:

    a. Drawing and General Provisions of the Contract, apply to work specified in this Section.
    b. Applicable Standards: All work shall be performed in accordance with the latest revisions of the following standards.

- *ANSI/TIA/EIA-568-C.1 and addenda*
  "Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements"

- *ANSI/TIA/EIA-568-C.2 and addenda*
  "Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted-Pair Cabling Components"

- *ANSI/TIA/EIA-568-C.3 and addenda*
  "Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling Components Standard"

- *ANSI/TIA/EIA-569-A and addenda*
  " Commercial Building Standard for Telecommunications Pathways and Spaces"

- *ANSI/TIA/EIA-606-A and addenda*
  " Administration Standard for the Telecommunications Infrastructure of Commercial Buildings"

- *ANSI/TIA/EIA-607 and addenda*
  " Commercial Building Grounding and Bonding Requirements for Telecommunications"

- *ANSI/TIA/EIA-526-7*
  "Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant"

- *ANSI/TIA/EIA-526-14-A*

- *International* Building *Code 2012 Edition*

- *International Fire Code 2012 Edition*

- *NEC (National Electric Code) 2017 Edition*

The most recent versions of all documents apply to this project.

B. Quality Assurance

1. Contractor Qualifications: Work in this section shall be performed by a licensed and bonded low voltage contractor, which has been in business for a minimum of five years in the maintenance and installation of high-speed data and voice networks. Only Contractors whose primary business in that of installing, maintaining, troubleshooting and testing computer and communication network systems shall perform this work.
2. The Contractor shall have installed cable plant in at least three buildings similar in size and scope to the project building and shall furnish references to the Owner and/or Engineer upon request.
3. The Contractor shall be completely familiar with the TIA/EIA standards for telecommunications raceway / pathway infrastructure systems and with the telecommunications design practices as defined in the BICSI Telecommunications Distribution Methods Manual.
4. Contractor must be a trained and certified for the communications cable and hardware, which it installs, and must furnish proof of certification.
5. Contractor shall have a BICSI registered RCDD on staff.
6. A system warranty shall provide a complete system warranty to guarantee end-to-end high performance cabling systems that meet application requirements. The guarantee shall include cable and connectivity components and have one point of contact for all cabling system issues. The system shall be warranted for a period of 20 years. The manufacturer of the telecommunications equipment, devices and cable shall warranty the entire telecommunications structured cable system to be in compliance with applicable codes and standards, and to be free from defects in materials and workmanship. The warranty shall apply to all passive structured cabling system components and shall cover failure of the system to support applications in accordance with the performance levels stipulated in the referenced TIA/EIA standards. This warranty shall extend for a period of at least (20) years from the date of final field-testing and acceptance of the system, and shall cover the full cost of all repairs and all replacement for the entire system.
7. Upon successful completion of the installation and subsequent inspection by the manufacturer's project manager, the manufacturer of the telecommunications equipment, devices and cable shall register the telecommunications structured cable system installation, and shall furnish a numbered registration certificate to the owner.
8. A factory registered contractor shall be on the construction site at all times while work is being performed; no subcontracting shall be allowed. All products specified herein shall be installed by the contractor represented in the proposal. The contractor shall have completed standards-based product and installation training. A copy of the contractor registration shall be provided.

    a. Note: All Networks shall be installed per applicable standards and manufacturer's guidelines.
    b. If any product fails to perform to industry or manufacture's standards the contractor shall provide new components at no charge to the owner.

9. LICENSE CLASSIFICATION: Contractor must possess a valid Oregon State Contractor's License.

1.4 DEFINITIONS

A. BICSI: Building Industry Consulting Service International.

B. Cross-Connect: A facility enabling the termination of cable elements and their

interconnection or cross-connection.

C. EMI: Electromagnetic interference.

D. IDC: Insulation displacement connector.

E. LAN: Local area network.

F. RCDD: Registered Communications Distribution Designer.

G. UTP: Unshielded twisted pair.

1.5 BACKBONE CABLING DESCRIPTION

A. Backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.

1.6 PERFORMANCE REQUIREMENTS

A. General Performance: Backbone cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

B. Governing Codes and Conflicts

1. If the requirements of this section or the Project Drawings exceed those of the governing codes and regulations, then the requirements of this section and the Drawing shall govern. However, nothing in this section or the Drawings shall be construed to permit work not conforming to all governing codes and regulations.

1.7 SUBMITTALS

A. Prior to installation of any equipment, the Contractor shall provide the submittals and drawings per Division 1 requirements. Submittals shall include a list of equipment with model numbers and quantities, catalog cuts, equipment specification sheets and installation instructions. Drawings shall include floor plans with equipment and wire locations, room numbers, one-line risers, and the jack numbering system proposed for the project. No equipment shall be purchased for the project until shop drawings have been reviewed and approved by the engineer and/or the owner. B. Product Data: For each type of product indicated.

1. For UTP (Copper) cable, include the following installation data for each type used:

    a. Nominal OD.
    b. Minimum bending radius.
    c. Maximum pulling tension.

2. For Fiber Optical cable, include the following installation data for each type used:

    a. Nominal OD.

b. Minimum bending radius.
c. Maximum pulling tension.

3. For all components of the system.

B. Shop Drawings:

1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
2. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
3. Cabling administration drawings and printouts.
4. Wiring diagrams to show typical wiring schematics including the following:

a. Cross-connects.
b. Patch panels.
c. Patch cords.

5. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.

C. Substitution Requests

1. Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Use CSI Form 13.1A or contractor/vendor form, which is substantially similar to the CSI form.
2. Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified material or product cannot be provided.
b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
d. Product Data, including drawings and descriptions of products and fabrications and installation procedures. Provide all available engineering documents, instructions, drawings and third party test reports.
e. Samples of each of the products being offered for substitution.
f. List of similar installations for completed projects with project names and addresses and names and address of architects and owners.
g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
i. Detailed comparison of Contractor’s Construction Schedule using proposed substitution with products specified in the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer’s letterhead, stating lack of availability or delays in delivery.
j. Cost information, including a proposal of change, if any, in the Contract Sum.

k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure or proposed substitution to product indicated results.
m. Acceptance of substitution must be received from the Owner in writing.

D. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.

E. Source quality-control reports.

F. Field quality-control reports.

G. Maintenance Data: For splices and connectors to include in maintenance manuals.

H. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

1. Installation Supervision: Installation shall be under the direct supervision of manufacture's registered technician, who shall be present at all times when work of this section is performed at project site.
2. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

B. Testing Agency Qualifications: An NRTL.

1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

C. 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.

D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.

E. Grounding: Comply with ANSI-J-STD-607-A.

1.9 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Patch-Panel Units: One of each type.
2. Connecting Blocks: One of each type.
3. Device Plates: 5% of total of each type.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.

1. Test optical fiber cable to determine the continuity of the strand end to end. Use optical loss test set.
2. Test optical fiber cable while on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector, including the loss value of each. Retain test data and include the record in maintenance data.

1.11 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.12 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. All products shall be new, and brought to the job site in original manufacturer’s packaging.

1. Electrical components shall bear the Underwriter’s Laboratories label.
2. Comply with TIA/EIA-569-A.

B. Telecommunications System Description

1. Provide the indicated number of Category 6 cables to each outlet. All horizontal cables are terminated on Category 6 UTP jacks installed in rack-mounted modular patch panels. Horizontal data circuits are connected to LAN electronics within each data rack location.

C. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.

1. Support brackets with cable tie slots for fastening cable ties to brackets.
2. Lacing bars, spools and J-hooks.
3. Straps and other devices.

D. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. WBT
2. Cooper B Line

E. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems."

1. Outlet boxes shall be no smaller than 4 inches wide, 3 inches high, and 4 inches deep.
2. Conduit shall be no smaller than 1”.

2.2 HORIZONTAL DISTRIBUTION SUB-SYSTEM

A. Work Area Outlets: Number of jacks per outlet location is as shown on plans. Use single-gang, flush mounted faceplates. Faceplates, single and double gang boxes shall match receptacle and switch cover plates per spec section 26 “wiring devices”. Provide blank faceplate inserts at any unfilled parts at the faceplates.

1. Cabling: Horizontal station cable shall be Solid Copper (copper clad Aluminum is NOT allowed), Category 6, 23 AWG UTP, UL/NEC CMR or CMP, non-plenum or plenum rated with a PVC jacket as required for the application. Provide Blue cable for all terminations unless otherwise noted.

B. Modular Jacks

1. All modular jacks shall be wired to the T568B wiring pattern. Modular jacks shall be of Snap into type. Modular jacks shall be UL Listed.
2. Category 6 modular jack devices, 8-position, 8-conductor modular jacks shall terminate unshielded twisted four pair, 22-26AWG, 100 Ohm cable and shall not require the use of a punch down tool. Jack module shall use forward motion termination to optimize performance by maintaining cable pair geometry and eliminating conductor untwist.
3. 3. Refer to drawings and electrical legend for symbol type and/or notes, which dictates the number of jacks and cable drops required. But there shall be a minimum of 2 data cables/jacks at each location.

C. Raceway

1. Work shall include furnishing all raceway and appropriate fittings and device plates to install a nonmetallic surface raceway system as indicated in the project drawings. Installer shall comply with detailed manufacturer’s instruction sheets which accompany system components.
2. All surface mounted raceways will be affixed to walls with the appropriate screws via pre-punched mounting holes. No adhesive tape shall be used to secure the raceway.
3. Multiple drops on a single wall will be fed by one vertical raceway.
4. All raceway will be plum and level.
5. Refer to drawing for locations and mounting heights and arrangement.

2.3 HORIZONTAL CROSS-CONNECT TERMINATION HARDWARE

A. Horizontal Data Cross-Connect

1. Patch panels 48 port, flush mount for enclosed racks and flat type.
2. Horizontal data cross-connect patch cords shall be provided for 100% of the patch panel terminations and be of adequate length to ensure proper cable bending radius and terminations can be achieved.

2.4 CABLE MANAGEMENT TIES

A. Bundle all communications cables together with Hook & Loop-type tie wraps. Cables of similar type should be bundled together. i.e.; Cat6 in a bundle

2.5 COMMUNICATIONS BACKBOARD

A. Data/Voice terminal backboards shall be 3/4” thick plywood painted with two (2) coats of White, fire retardant paint, APA exterior grade Douglas Fir A-C, and fire retardant with flame spread rating not more than 25 when tested according to ASTM E-84. Refer to drawing for locations, quantities and mounting arrangement.

2.6 EQUIPMENT MOUNTING RACKS

A. Equipment Rack(s): Provide 19" wide with number of vertical rack sections as required to allow space for termination of all Category 6 cabling plus mounting space for multi-port switches required to cross-connect all data jacks. See Drawings for details. Final rack location to be coordinated with the owner prior to installation. Utilize a 4-post rack in each location, unless otherwise noted, with a minimum of (2) 4-post racks shall be located in the MDF Room. If 4-post racks don’t fit in the IDF then a 2-post rack should be installed. If a 2-post rack will not fit, then provide wall mounted lockable enclosures. Note (3-foot area in front and behind the rack should be left open for accessibility) Where possible all power requirements should be put on the rack to prevent tripping hazards behind or in front of the rack.

B. Distribution Rack Grounding: furnish ground terminal strip for each rack section installed. Rack shall be grounded using stranded, #6 AWG Green insulated copper conductor. Furnish all required bonding material and hardware, and bond to building grounding electrode subsystem

C. Vertical Wire Management: The Cable Management System shall be used to provide a neat and efficient means for routing and protecting fiber and copper cables and patch cords on telecommunication racks and enclosures. The system shall protect network investment by maintaining system performance, controlling cable bend radius and providing cable strain relief. The vertical wire management shall be either single sided or double sided per the project design. Each floor mounted rack shall have a vertical wire manager on each side of rack for routing of cable on the back side and patch cords on the front side. If two racks are side by side, then only one Vertical Wire Manager is needed in-between with another vertical wire manager on each end of row. No vertical wire manager is required for wall mounted racks/cabinets.

2.7 OPTICAL FIBER

A. Interior Optical Fiber Description: Multi-mode, OS2, 12 -fiber, distribution Plenum, Armored, gel-free optical fiber cable.

1. Comply with ICEA S-83-596 for mechanical properties.
2. Comply with TIA/EIA-568-B.3 for performance specifications.
3. Comply with TIA/EIA-492AAAA-A for detailed specifications.
4. Conductive cable shall be aluminum armored type.
5. Jacket Color: Orange for Multi-mode cable.

2.8 OPTICAL FIBER CABLE HARDWARE

A. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.

1. Number of Connectors per Field: 12 for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.

B. Patch Cords: Factory-made, dual-fiber cables in 36-inch (900-mm) lengths.

C. Fiber Optic Connectors: Fiber Optic Connectors shall be pre-polished, cam termination, simplex fiber optic connectors for multimode glass fiber that fully complies with both the fiber optic connector performance requirements specified in TIA/EIA-568-B.3 and the interminability requirements specified by the TIA-604 FOCIS-3 standard.

D. Rack Mounted Fiber Optic Patch Panels: Provide rack mounted modular enclosure units complete with connector couplings mounted in LC connector panels for interconnection of backbone optical fiber cables as specified herein. Units shall be sized to terminate all fibers indicated on the Drawings using mechanical or fusion splices.

2.9 UTP CABLE

A. Description: 100-ohm, four-pair UTP, binder groups covered with a blue thermoplastic jacket.

1. Comply with ICEA S-90-661 for mechanical properties.
2. Comply with TIA/EIA-568-B.1 for performance specifications.
3. Comply with TIA/EIA-568-B.2, Category 6.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:

    a. Communications, General Purpose: Type CM or CMG.
    b. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
    c. Communications, Riser Rated: Type CMR; complying with UL 1666.
    d. Communications, Limited Purpose: Type CMX
    e. Multipurpose: Type MP or MPG
    f. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
    g. Multipurpose, Riser Rated: Type MPR, complying with UL 1666.

2.10 UTP CABLE HARDWARE

A. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.

B. Connecting Blocks: 110-style IDC for Category 6. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.

C. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.

1. Number of Terminals per Field: One for each conductor in assigned cables.

D. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.

1. Number of Jacks per Field: One for each four-pair UTP cable indicated plus spares and blank positions adequate to suit specified expansion criteria.

E. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.

F. Patch Cords: Factory-made, four-pair cables in 1 Foot for patch panel end and 10 Foot for outlet end lengths; terminated with eight-position modular plug at each end.

1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.
2. Patch cords shall have color-coded boots for circuit identification.
3. Provide an additional 25% more than the total terminations at patch panels.

2.11 LOW-VOLTAGE CONTROL CABLE

A. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.

1. One pair, twisted, No. 16 AWG, stranded (19x29) tinned-copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with NFPA 262.

2.12 CONTROL-CIRCUIT CONDUCTORS

A. Class 1 Control Circuits: Stranded copper, Type THHN-THWN, in raceway, complying with UL 83.

B. Class 2 Control Circuits: Stranded copper, Type THHN-THWN, in raceway, complying with UL 83.

C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or Type TF, complying with UL 83.

2.13 GROUNDING

A. Comply with requirements in Section 260526 "Grounding” for grounding conductors and connectors. B. Comply with ANSI-J-STD-607-A.

2.14 IDENTIFICATION PRODUCTS

A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

2.15 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test cables on reels according to TIA/EIA-568-C.3.

C. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-C.3.

D. Cable will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 PRODUCTION INSPECTIONS

A. The Contractor shall inspect all cable prior to installation to verify that it is identified properly on the reel identification label, that it is of proper gauge, containing correct number of pairs, and is the material ordered. Any physical damage to the cable and wire must be noted: nonuniform jacket thickness and jacket tightness should also be identified. Note any buckling of the jacket, which would indicate possible problems.

B. Installation approval by owner is required at each phase of construction as noted below. Proceeding without owner approval may result in rejection of work and/or installation and result in the contractor removing newly installed raceway, boxes, cables, racks, and etc. (all system components).

1. Submittal documents (shop drawings).
2. Substitution requests.
3. Raceway Rough-in.
4. Rack location and installation.
5. Grounding.
6. Patch panel installation.
7. Contractor furnished electronics equipment.
8. Cable installation.
9. Cable terminations at Rack and faceplate.
10. Installation of faceplates.

3.2 INSTALLATION OF CABLES

A. Comply with NECA

B. General Requirements for Cabling:

1. Comply with TIA/EIA-568-B.1.
2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices." 3. Install 110-style IDC termination hardware unless otherwise indicated.
3. Consolidation points may be used only for making a direct connection to telecommunications outlet/connectors:

    a. Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.
    b. Locate consolidation points for UTP at least 49 feet (15 m) from communications equipment room.

4. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
5. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
6. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
7. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
8. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
9. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
10. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.
11. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
12. Cable shall not be draped on, tied or otherwise secured to electrical conduit, plumbing, ventilation ductwork or any other equipment. Cable shall be secured to building supports or hangers or to additional blocks or anchors specifically installed for this purpose.
13. Conduit and Raceway Usage: All communications cable shall be installed in grounded metal Conduit or raceway dedicated for communications purposes, when called for on the Project Drawings, and not to be shared with electrical wiring.
14. Cable Lubricants: Lubrications specifically designed for installing communications cable may be used to reduce pulling tension as necessary when pulling cable into conduit. After installation, exposed cable and other surfaces must be cleaned of lubricant residue. Recommended Products: Dyna-Blue, American Polywater
15. Conduit and Raceway Fill: In general, communication raceway shall not be filled beyond 40% capacity.
16. Backboard and Rack Cable Supports: Clamps, “D-Rings” and Velcro tie-wraps are all Acceptable ways to support cable. However, installation of these supports must be done with care so as not to cause crushing or distortion of the cable, nor cause tighter bends than the minimum radius permitted for each type cable. Refer to “Part 2-Products” of this specification section for specified supports and tie-wraps. C. UTP Cable Installation:

    a. Comply with TIA/EIA-568-B.2.
    b. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

C. Optical Fiber Cable Installation:

1. Comply with TIA/EIA-568-B.3.
2. Cable may be terminated on connecting hardware that is rack or cabinet mounted.

D. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

E. Group connecting hardware for cables into separate logical fields.

F. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-B for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

3.3 DATA/TELEPHONE STATION CABLING

A. Cables shall be coiled in the in-wall or surface-mount boxes if adequate space is present to house the cable coil without exceeding the manufacturers bend radius. No more than 12” of slack shall be stored in an in-wall box. Excess slack may be neatly coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable. Each cable shall be labeled with a numbering scheme approved by the Owner, at each end of the cable.

B. In addition, each cable type shall be terminated as indicated below:

1. Cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-A document, manufacturer's recommendations and/or best industry practices.
2. Pair untwist at the termination shall not exceed one-half an inch for Category 6 connecting hardware.
3. Bend radius of the cable in the termination area shall not be less than 10 times the outside diameter of the cable.
4. The cable jacket shall be maintained as close as possible to the termination point.
5. Voice jacks in horizontally oriented faceplates shall occupy the left-most position(s). Modem jacks shall be considered the last voice jack in the sequence.

C. Station drop cable terminations shall be made at the data port at the patch panel and the same data outlet at the data/telephone station location. Label patch panel port and station outlet the same. At each outlet box, a sufficient length of spare cable will be provided for terminating outlet devices such that the outlet can be easily removed and inspected.

D. If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of four-foot intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.

E. Horizontal distribution cables shall be bundled in groups of not greater than 40 cables. Cable bundle quantities in excess of 40 cables may cause deformation of the bottom cables within the bundle.

F. Cables shall not be attached to ceiling grid or lighting support wires. Where light support for drop cable legs is required, the contractor shall install clips to support the cabling.

G. The installation of cables around movable devices, instruments, sub panels, etc., shall be provided with adequate support, length, protection, and flexibility so that the cable is not damaged in the event the equipment is moved.

H. Data cable may be run perpendicular, parallel or at 45 degrees to building grid lines (excluding radial and circulate grid lines). Cable in ceilings and below raised floor areas shall be grouped and wrapped in Velcro bundles of two or more cables as appropriate. Every attempt shall be made to avoid running telecommunications close to (less than 24") and parallel to power raceway and wiring, or close to light fixtures.

3.4 MDF/IDF BACKBOARD CABLING

A. Cable installation must conform to the Project Drawings. All cabling shall be routed so as to avoid interference with any other service or system, operation, or maintenance purposes such as access boxes, ventilation mixing boxes, access hatches to air filters, switch or electrical outlets, electrical panels, fire alarm equipment, clock systems, and lighting fixtures. Avoid crossing areas horizontally just above or below any riser conduit. Lay and dress cables to allow other cables to enter the conduit/riser without difficulty at a later time by maintaining maximum distance from these openings.

B. Cable shall be routed as close as possible to the ceiling, floor, or corners to insure that adequate backboard space is available for current and future equipment and for cable terminations. Cables shall not be tie-wrapped to existing electrical conduit or other equipment. Minimum bend radius shall be observed.

C. Lay cables via the shortest route directly to the nearest edge of the backboard from the mounted equipment or block. Lace or tie-clamp all similarly routed cables together, and attached by means of clamps screwed to the outside edge(s) of the backboard vertically and/or horizontally, then route via “square” corners over a path that will offer minimum obstruction to future installations of equipment, backboards, or other cables.

3.5 BACKBONE CABLE

A. Backbone cables shall be installed separately from horizontal distribution cables.

3.6 CABLE LABELING

A. All cables shall be labeled at each end with the same numbering scheme as approved by the owner.

B. The Contractor shall follow the owner’s approved labeling scheme for both faceplate and patch panel location. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.

C. All label printing will be machine generated label using black on clear adhesive Mylar tape. Self-laminating labels will be used on cable jackets, appropriately sized to the outside diameter of the cable, and placed within view at the termination point on each end. Outlet labels will be the manufacturer’s labels provided with the outlet assembly. The specific nomenclature for labels shall follow the school district’s labeling Scheme.

D. Station Faceplate and Patch Panel Labeling. Each station outlet terminal shall be identified and marked on the patch panel as described below:

E. All devices that are connected to the network but use a biscuit instead of a wall jack that prevents the user from seeing the jack information w/o having to unmount the device such as wireless access points clocks, speakers, and cameras need to be labeled clearly on the device with the IDF and patch panel information. The labeling font need to be large enough that it can be read by a person who may be ground level but the device is mounted on a wall or ceiling.

F. F. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

3.7 WIRING METHODS

A. Wiring Method: Install cables in raceways except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

1. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Comply with requirements for raceways and boxes specified in Division 26 Section "Raceway and Boxes for Electrical Systems."

B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.8 INSTALLATION OF PATHWAYS

A. Comply with requirements for demarcation point, pathways, cabinets, and racks specified in Division 27 Section "Communications Equipment Room Fittings." Drawings indicate general arrangement of pathways and fittings.

B. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.

C. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.

D. Install manufactured conduit sweeps and long-radius elbows whenever possible.

E. Pathway Installation in Communications Equipment Rooms:

1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
2. Secure conduits to backboard when entering room from overhead.
3. Extend conduits 3 inches (76 mm) above finished floor.
4. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

F. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

3.9 FIRESTOPPING

A. Comply with requirements in Division 07 Section "Firestopping". “Comply with TIA/EIA-569-A, Annex A, "Firestopping."

B. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.10 GROUNDING

A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. Comply with ANSI-J-STD-607-A.

C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.11 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Visually inspect UTP and optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test UTP copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.

    a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

C. Testing UTP Cables and Links

1. All UTP cabling will be certified to meet and or exceed the specifications as set forth in the Link Performance Testing Specifications in the Transmission Performance Specifications for Field-Testing Of Unshielded Twisted-Pair Cabling Systems, TIA/EIA 568-B.2-1 (current draft) using a level III field tester. Certifications shall include the following parameters for each pair of each cable installed (parameters shall be tested up to a frequency sweep of 300 MHz):

    a. Wire map (pin to pin connectivity)
    b. Length (in feet)
    c. Attenuation
    d. Near End Crosstalk (NEXT)
    e. Far End Crosstalk (FEXT)
    f. ELFEXT
    g. Attenuation/Crosstalk Ration (ACR)
    h. Return Loss
    i. Propagation Delay
    j. Delay Skew
    k. Test equipment shall provide an electronic and printed record of these tests. Test equipment shall be a Fluke Networks DTX-1200 or Fluke Networks DTX-1800 tester.
    l. Owner reserves the right to hire an independent testing company to spot check the test results. If the results very more than 10% from the results provided by the Contractor, the Contractor will be required to prove his results are correct or retest the entire system.
    m. If test is using a Fluke tester (2071 or 1071) to guarantee accuracy and correct NVP is entered in tester.

2. Optical Fiber Cable Tests:

    a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568.C. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
    b. Link End-to-End Attenuation Tests:
    c. Horizontal and multi-mode backbone link measurements: Test at 1310 or 1550 nm in 1 direction according to TIA/EIA-568.C, Method B, One Reference Jumper.

D. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

E. Remove and replace cabling where test results indicate that they do not comply with specified requirements.

F. End-to-end cabling will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

3.12 AS-BUILT DRAWINGS

A. The Cabling Contractor shall provide three sets of As-Built drawings to the Owner, which clearly indicates:

1. A floor plan of the building showing the As-Built location of data drops, conduit runs, and terminal cabinets.
2. A listing of all stations with each data drop clearly identified according to system labeling scheme. Show all ports and punchdowns.

END OF SECTION

SECTION 283100

FIRE ALARM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes fire alarm systems.

B. Related Sections include the following:

1. Division 8 Section "Door Hardware" for door closers and holders with associated smoke detectors, electric door locks, and release devices that interface with the fire alarm system.

1.3 DEFINITIONS

A. FACP: Fire alarm control panel.

B. LED: Light-emitting diode.

C. NICET: National Institute for Certification in Engineering Technologies.

D. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.4 SYSTEM DESCRIPTION

A. Addressable system; multiplexed signal transmission dedicated to fire alarm service with horn/strobes. This system shall be capable of handling the entire fire system requirements of the building including, but not limited to fire sprinkler monitoring, magnetic door hold open equipment, HVAC equipment, Elevator Recall and horn/strobes throughout the entire building.

1.5 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 72.

B. Premises protection includes Fully Sprinkled Type Occupancy.

C. Fire alarm signal initiation shall be by one or more of the following devices:

1. Manual stations.
2. Heat detectors.
3. Flame detectors.
4. Smoke detectors.
5. Verified automatic alarm operation of smoke detectors.
6. Automatic sprinkler system water flow.
7. Fire extinguishing system operation.
8. Fire standpipe system.

D. Fire alarm signal shall initiate the following actions:

1. Alarm notification appliances shall operate continuously.
2. Identify alarm at the FACP and remote annunciators.
3. De-energize electromagnetic door holders.
4. Transmit an alarm signal to the remote alarm receiving station.
5. Unlock electric door locks in designated egress paths.
6. Release fire and smoke doors held open by magnetic door holders.
7. Activate voice/alarm communication system.
8. Switch heating, ventilating, and air-conditioning equipment controls to fire alarm mode.
9. Close smoke dampers in air ducts of system serving zone where alarm was initiated.
10. Record events in the system memory with ability to be printed.

E. Supervisory signal initiation shall be by one or more of the following devices or actions:

1. Operation of a fire-protection system valve tamper.
2. Operation of any duct detectors or induct detectors.

F. System trouble signal initiation shall be by one or more of the following devices or actions:

1. Open circuits, shorts and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.
2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at the FACP.
4. Ground or a single break in FACP internal circuits.
5. Abnormal ac voltage at the FACP.
6. A break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at the FACP or annunciator.
9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
10. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.

G. System Trouble and Supervisory Signal Actions: Annunciate at the FACP and remote annunciators. Record the event on system memory with ability to be printed.

1.6 SUBMITTALS

Prior to the start of work, the contractor shall provide a complete and comprehensive submittal for review by the engineer. Once the engineer of record has reviewed and approved the submittal, the contractor shall provide a complete submittal to the Authority Having Jurisdiction for their review and approval. The contractor is responsible for obtaining and paying for the fire alarm permits that may be required. The

submittals shall be prepared by a NICET III certified, factory trained personnel. This person shall provide to the engineer of record the proof of NICET certification and proof of factory training if requested. Factory training means that this person has received training at the factory. These are to describe the proposed system and its equipment. Failure to provide a complete submittal shall be grounds for summary rejection of any incomplete submittal documentation. Contractors who provide re-submittal's, due to prior rejection shall be subject to a re-review fee, should the Engineer elect to do so. The complete submittal shall include, but not be limited to, all of the following material:

A. Power Calculations

1. Battery capacity calculations shall be a minimum of 125% of the calculated requirement.
2. Supervisory power requirements for all equipment.
3. Alarm power requirements for all equipment.
4. Power supply rating justification showing power requirements for each of the system power supplies. Power supplies shall be sized to furnish the total connected load in a worst case condition plus 25% spare capacity.
5. Voltage-drop calculations for wiring runs demonstrating worst case condition.

B. Complete manufacturers catalog data including supervisory power usage, alarm power usage, physical dimensions, finish and mounting requirements.

C. Complete drawings covering the following shall be submitted by the contractor for the proposed system. Floor plans in a CAD compatible format showing all equipment and raceways, marked for size, conductor count with type and size, showing the percentage of allowable National Electric Code fill used. Floor plans will be prepared at 1/8" scale.

D. A complete proposed system database including a description of all logic strings, control by event programming and point identification labels on a flash drive and in a formatted printed form, as required for offsite editing, shall be submitted for evaluation by the owner.

1. The program shall include all required interactive control functions between the local network systems and the methods for implementing these actions.

E. Provide the address, telephone number, and contact person(s) of the manufacturer's local service facility for normal and off-hour warranty issues.

F. If the fire alarm system and its equipment are supplied by a manufacturer's distributor, as part of the submittal documentation, the manufacturer shall provide, on its corporate letterhead, a "letter of support". Said "letter of support" shall state that, when in the opinion of the Engineer, the distributor's efforts require back-up and/or assistance, the manufacturer shall provide, at no cost to the Owner, all required technical support during the installation phase and for a one (1) year guarantee period starting on the date of final acceptance by the owner and the authority having jurisdiction. If said "letter of support" is not submitted, the manufacturer's equipment will be deemed unacceptable and shall be grounds for summary rejection.

G. Provide a fire alarm system function matrix. Matrix shall illustrate alarm output events in association with initiating devices input events. Matrix shall represent a summary of the installed system alarm, supervisory and trouble functions. Include any and all departures, exceptions, variances or substitutions from these specifications and/or drawings at the time of bid. Failure to provide this requirement shall be cause for summary rejection of submittal documents where additional departures are discovered. (See NFPA-72 for minimum matrix requirements)

H. For each system control panel and/or transponder panel, provide panel ampere loading during both normal and alarm modes, with time calculations to substantiate compliance with battery back-up power requirements (battery Ampere-Hour capacity), described elsewhere in these specifications.

I. For each system control panel and/or transponder panel, provide written schedule of active and spare addresses provided on each addressable circuit to substantiate compliance with circuit usage/spare requirements, described elsewhere in these specifications.

J. For each system control panel and system transponder notification appliance circuit provide a written schedule of spare capability in amperes available for future possible use.

K. Provide manufacture's printed product data, catalog pages and descriptions of any special installation requirements and/or procedures. Drawings depicting any special physical installation requirements shall show physical plans, elevations, all dimensions, conduit entry, minimum access clearances and any other details required.

L. Provide shop drawings as follows:

1. Drawing or catalog page showing actual dimensions of the main FCS.
2. Drawing(s) or catalog page(s) showing actual dimensions of any additional system control panels, and/or battery cabinets.
3. Drawing or catalog page showing actual dimensions of the remote annunciator(s).
4. Single line riser diagram showing, all equipment, all connections and number and size of all conductors and conduits.
5. Provide samples of various items when so requested by the architect/engineer.

M. The fire protection contractor shall provide copies of certification for service technician's formal training by the system manufacture. As a minimum, certification documents shall indicate training dates, systems qualified, name of individual certified and current status.

N. Product Data: For each type of product indicated within 90 days of notice to proceed.

O. Within 30 days of notice to proceed, the contractor shall submit a programming printout and digital copy of the program to the Engineer for review.

P. Qualification Data: For Installer: NICET Level III certification within 30 days of notice to proceed.

Q. Field quality-control test reports: provide test reports 10 days prior to final test requirements.

R. Operation and Maintenance Data: For fire alarm system to include in emergency, operation, and maintenance manuals. Comply with NFPA 72, recommendations for Owner's manual. Include abbreviated operating instructions for mounting at the FACP.

S. Documentation:

1. Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Owner, Architect, and authorities having jurisdiction.
2. Record of Completion Documents: Provide the "Permanent Records" according to NFPA 72 to Owner, Architect, and authorities having jurisdiction. Format of the written sequence of operation shall be the optional input/output matrix.

    a. Hard copies on paper to Owner, Architect, and authorities having jurisdiction.

b. Electronic media may be provided to Architect.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Installer Qualifications: Personnel certified by NICET as Fire Alarm Level III.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. 30 days after award of bid, the contractor shall conduct a meeting with the owner; owners representative, the Engineer and the architect to discuss compliance of the specifications and drawings.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Initiating Appliances: Quantity equal to 10 percent of amount of each type installed, but not less than 1 unit of each type.
2. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than 1 unit of each type.
3. Keys and Tools: One extra set for access to locked and tamper proofed components.
4. Audible and Visual Notification Appliances: One of each type installed.
5. Fuses if applicable: Two of each type installed in the system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. FACP and Equipment:
   a. Silent Knight by Honeywell
   b. Fire-Lite Alarms by Honeywell
   c. Gamewell/FCI by Honeywell
   d. EST
   e. Notifier by Honeywell
   f. Siemens

2. Wire and Cable:

   a. Comtran Corporation.
   b. Helix/HiTemp Cables, Inc.; a Draka USA Company.

c. Rockbestos-Suprenant Cable Corporation; a Marmon Group Company.
d. West Penn Wire/CDT; a division of Cable Design Technologies.

3. Audible and Visual Signals:
   a. System Sensor
   b. Wheelock
   c. Gentex

2.2 FACP

A. General Description:

1. Modular, power-limited design with electronic modules, UL 864 listed.
2. Addressable initiation devices that communicate device identity and status.

   a. Smoke sensors shall additionally communicate sensitivity setting and allow for adjustment of sensitivity at the FACP.
   b. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.

3. Addressable control circuits for operation of mechanical equipment.

B. Alphanumeric Display and System Controls: Arranged for interface between human operator at the FACP and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Annunciator and Display: Liquid-crystal type, three line(s) of 80 characters, minimum.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands; and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.

C. Circuits:

1. Signaling Line Circuits: NFPA 72, Class B.

   a. System Layout: Each signaling line circuit shall be loaded no more than 80% capacity.
2. Actuation of alarm notification appliances, annunciation, smoke control, shall occur within 10 seconds after the activation of an initiating device.
3. Electrical monitoring for the integrity of wiring external to the FACP for mechanical equipment shutdown and magnetic door-holding circuits is not required, provided a break in the circuit will cause doors to close and mechanical equipment to shut down.

D. Smoke-Alarm Verification:

1. Initiate audible and visible indication of an "alarm verification" signal at the FACP.
2. Activate a listed and approved "alarm verification" sequence at the FACP and the detector.
3. Sound general alarm if the alarm is verified.
4. Cancel FACP indication and system reset if the alarm is not verified.

E. Notification-Appliance Circuit: Operation shall sound in a temporal pattern, complying with ANSI S3.41.

F. Power Supply for Supervision Equipment: Supply for audible and visual equipment for supervision of the ac power shall be from a dedicated dc power supply, and power for the dc component shall be from the ac supply.

G. Alarm Silencing, Trouble, and Supervisory Alarm Reset: Manual reset at the FACP and remote annunciators, after initiating devices are restored to normal.

1. Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm silence" light. Display of identity of the alarm zone or device is retained.
2. Subsequent alarm signals from other devices or zones reactivate notification appliances until silencing switch is operated again.
3. When alarm-initiating devices return to normal and system reset switch is operated, notification appliances operate again until alarm silence switch is reset.

H. Walk Test: A test mode to allow one person to test alarm and supervisory features of initiating devices. Enabling of this mode shall require the entry of a password. The FACP and annunciators shall display a test indication while the test is underway. If testing ceases while in walk-test mode, after a preset delay, the system shall automatically return to normal.

I. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and control of changes in those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and make a print-out of the final adjusted values on the system printer.

J. Service Modem: Ports shall be RS-232 for system printer and for connection to a dial-in terminal unit.

1. The dial-in port shall allow remote access to the FACP for programming changes and system diagnostic routines. Access by a remote terminal shall be by encrypted password algorithm.

K. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signal, supervisory signal supervisory and digital alarm communicator transmitter shall be powered by the 24-V dc source.

1. The alarm current draw of the entire fire alarm system shall not exceed 80 percent of the power-supply module rating.
2. Power supply shall have a dedicated fused safety switch for this connection at the service entrance equipment. Paint the switch box red and identify it with "FIRE ALARM CIRCUIT."

L. Secondary Power: 24-V dc supply system with batteries and automatic battery charger and an automatic transfer switch.

1. Batteries: Vented, wet-cell pocket, plate nickel cadmium.
2. Battery and Charger Capacity: Comply with NFPA 72.

M. Surge Protection:

1. Install surge protection on normal ac power for the FACP and its accessories. Comply with Division 26 Section "Transient Voltage Suppression" for auxiliary panel suppressors.

2. Install surge protectors recommended by FACP manufacturer. Install on all system wiring external to the building housing the FACP.

N. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.3 FIRE ALARM DOCUMENT CABINET

A. General Description:
1. Minimum 18 gauge steel construction
2. Textured, baked on red enamel finish
3. Business card holder
4. Key ring hooks
5. Legend sheet for passwords and system information
6. Cover shall have white lettering that reads “SYSTEM RECORD DOCUMENTS”

2.4 Addressable initiation MANUAL FIRE ALARM BOXES

A. Description: UL 38 listed; finished in red with molded, raised-letter operating instructions in contrasting color. Station shall show visible indication of operation. Mounted on recessed outlet box; if indicated as surface mounted, provide manufacturer's surface back box.
1. Single-action mechanism requiring single actions to initiate an alarm, pull-lever type. With integral addressable module, arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP
2. Station Reset: Key- or wrench-operated switch.
3. Indoor Protective Shield: Factory-fabricated clear plastic enclosure, hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.

2.5 SYSTEM SMOKE DETECTORS

A. General Description:
1. UL 268 listed, operating at 24-V dc, nominal.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
3. Multipurpose type, containing the following:
   a. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
   b. Heat sensor, combination rate-of-rise and fixed temperature.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection of building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status.
7. Where noted on drawings provide a welded wire screen protective cover.

8. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
    a. Provide multiple levels of detection sensitivity for each sensor.

B. Photoelectric Smoke Detectors:

1. Sensor: LED or infrared light source with matching silicon-cell receiver.
2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

C. Duct Smoke Detectors:

1. Photoelectric Smoke Detectors:

    a. Sensor: LED or infrared light source with matching silicon-cell receiver.
    b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

2. UL 268A listed, operating at 24-V dc, nominal.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.

    a. Weatherproof Duct Housing Enclosure: UL listed for use with the supplied detector. The enclosure shall comply with NEMA 250 requirements for Type 4X.

5. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating status. Provide remote status and alarm indicator and test station where indicated.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
8. Each sensor shall have multiple levels of detection sensitivity.
9. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.
10. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.6 NOTIFICATION APPLIANCES

A. Description: Equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.
2. Where called for on plans to have a wire guard, provide and install a welded wire screen guard of appropriate size. Polycarbonate or other transparent protective covers are prohibited.

B. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet (3 m) from the horn.

C. Visible Alarm Devices: Xenon strobe lights listed under UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Rated Light Output: as indicated.
2. Strobe Leads: Factory connected to screw terminals.
3. Where called for on plans to have a wire guard, provide and install a welded wire screen guard of appropriate size. Polycarbonate or other transparent protective covers are prohibited.

2.7 SPRINKLER SYSTEM REMOTE INDICATORS

A. Remote status and alarm indicator and test stations, with LED indicating lights. Light is connected to flash when the associated device is in an alarm or trouble mode. Lamp is flush mounted in a single-gang wall plate. A red, laminated, phenolic-resin identification plate at the indicating light identifies, in engraved white letters, device initiating the signal and room where the smoke detector or valve is located. For water-flow switches, the identification plate also designates protected spaces downstream from the water-flow switch.

2.8 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching door plate.

1. Electromagnet: Requires no more than 3 W to develop 25-lbf (111-N) holding force.
2. Wall-Mounted Units: Flush mounted, unless otherwise indicated.
3. Rating: 24-V dc.

B. Material and Finish: Match door hardware.

2.9 REMOTE ANNUNCIATOR

A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, resetting, and testing.

1. Mounting: Flush cabinet, NEMA 250, Class 1.

B. Display Type and Functional Performance: Alphanumeric display same as the FACP. Controls with associated LED's permit acknowledging, silencing, resetting, and testing functions for alarm, supervisory, and trouble signals identical to those in the FACP.

2.10 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module listed for use in providing a system address for listed alarm-initiating devices for wired applications with normally open contacts.

B. Integral Relay: Capable of providing a direct signal to the elevator controller to initiate elevator recall where indicated to a circuit-breaker shunt trip for power shutdown and to release doors.

2.11 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Listed and labeled according to UL 632.

B. Functional Performance: Unit receives an alarm, supervisory, or trouble signal from the FACP, and automatically captures one or two telephone lines and dials a preset number for a remote central station. When contact is made with the central station(s), the signal is transmitted. The unit supervises up to two telephone lines. Where supervising 2 lines, if service on either line is interrupted for longer than 45 seconds, the unit initiates a local trouble signal and transmits a signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. When telephone service is restored, unit automatically reports that event to the central station. If service is lost on both telephone lines, the local trouble signal is initiated.

C. Secondary Power: Integral rechargeable battery and automatic charger. Battery capacity is adequate to comply with NFPA 72 requirements.

D. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.12 GUARDS FOR PHYSICAL PROTECTION

A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.

1. Factory fabricated and furnished by manufacturer of the device.
2. Finish: Paint of color to match the protected device.

2.13 WIRE AND CABLE

A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NFPA 70, Article 760.

B. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG size as recommended by system manufacturer.

1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70 Article 760, Classification CI, for power-limited fire alarm signal service. UL listed as Type FPL, and complying with requirements in UL 1424 and in UL 2196 for a 2-hour rating.

C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Line-Voltage Circuits: No. 12 AWG, minimum.

D. All wire and cable shall be installed in conduit.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Smoke or Heat Detector Spacing:

1. Smooth ceiling spacing shall not exceed [30 feet (9 m)] .
2. Spacing of heat detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas, shall be determined according to Appendix A in NFPA 72.
3. Spacing of heat detectors shall be determined based on guidelines and recommendations in NFPA 72.

B. HVAC: Locate detectors not closer than 3 feet (1 m) from air-supply diffuser or return-air opening.

C. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of the duct.

D. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.

E. Audible Alarm-Indicating Devices: Install between 80” and 96” above finished floor, this height is to the visual lens portion of the device, or on ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.

F. Visible Alarm-Indicating Devices: Install integral to each alarm horn if noted.

G. Device Location-Indicating Lights: Locate in public space near the device they monitor.

H. FACP: Surface mount with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

I. Annunciator: Install with top of panel not more than 72 inches (1830 mm) above the finished floor.

J. Fire alarm document cabinet shall be located adjacent to the fire alarm control panel or at another location that has been approved by the AHJ. If not located at the fire alarm control panel, the exact location shall be identified on the fire alarm control panel.

3.2 WIRING INSTALLATION

A. Install wiring according to the following:

1. NECA 1.
2. TIA/EIA 568-A.

B. Wiring Method: Install wiring in metal raceway according to Division 26 Section "Raceways and Boxes."

1. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.

C. Wiring Method:

1. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
2. Fire-Rated Cables: Use of 2-hour fire-rated fire alarm cables, NFPA 70 Types MI and CI, is not permitted.
3. Signaling Line Circuits: Power-limited fire alarm cables may be installed in the same cable or raceway as signaling line circuits.

D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

E. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

F. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

G. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 26 Section "Electrical Identification."

B. Install instructions frame in a location visible from the FACP.

C. Paint power-supply disconnect switch red and label "FIRE ALARM CIRCUIT."

D. The location of the branch-circuit overcurrent protective devices shall be permanently identified at the fire alarm control unit.

3.4 GROUNDING

A. Ground the FACP and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to the FACP.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to witness field tests and inspections and prepare test reports. The contractor shall provide all personnel for this test. There shall be two tests, one prior to the Fire Marshall test and one with the Fire Marshall.

C. Perform the following field tests and inspections and prepare test reports:

1. Before requesting final approval of the installation, submit a written statement using the form for Record of Completion shown in NFPA 72.
2. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters.
3. Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.
4. Testing: Follow procedure and record results complying with requirements in NFPA 72.

    a. Detectors that are outside their marked sensitivity range shall be replaced.

5. Test and Inspection Records: Prepare according to NFPA 72.

D. At no time shall the contractor make changes to the documents without written permission from the Engineer.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the fire alarm system, appliances, and devices. Refer to Division 1 Section "Closeout Procedures and Demonstration and Training."

END OF SECTION 283100

Appendix

THE L&R GROUP
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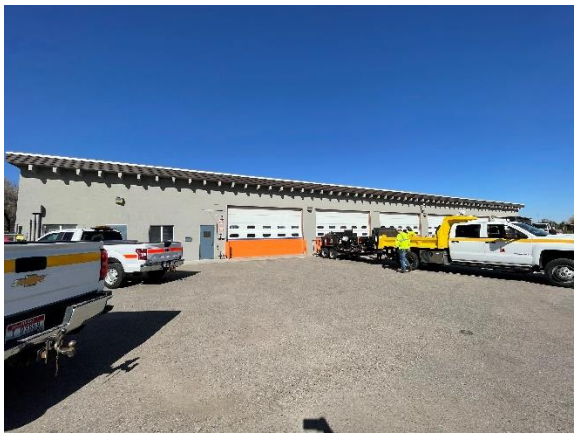
Meridian, Idaho 83642
208-813-7700

NESHAP Asbestos Inspection

ITD Storage Shed B5601
380 W 50 N State Rd Blackfoot, ID



Prepared For:
Idaho Division of Public Works
502 North 4th Street
Boise, Idaho, 83702

L&R Project #: 220580T
L&R Investigator/Project Manager: Kaya Stahle
Report Date: April 21, 2022

THE L&R GROUP

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Idaho Division of Public Works
502 North 4th Street
Boise, Idaho, 83702

RE: Limited Asbestos Inspection
ITD Storage Shed B5601
380 W 50 N State Rd Blackfoot, ID

Idaho Division of Public Works (client) retained The L&R Group (L&R) to perform a Limited National Emission Standards for Hazardous Air Pollutants (NESHAP) Asbestos Inspection for ITD Storage Shed B5601 located on 380 W 50 N State Rd Blackfoot, ID (the property). L&R's accredited asbestos inspector, Kaya Stahle, performed an on-site inspection for the NESHAP assessment on April 7, 2022. The purpose of the assessment was to identify if regulated asbestos containing materials (ACM) are present in the subject property building.

The report summarizes L&R's inspection findings and laboratory results. This inspection report *(i.e., cover letter, report, and appendices)* is for the exclusive use of the client, and L&R does not authorize the use of the report to other parties without the expressed written permission of both the client and L&R.

L&R collected 16 samples from 8 homogenous areas during this assessment. **No samples were determined to contain asbestos above the regulated quantity of greater than 1%**. All thermal system insulation was observed to be fiberglass and not sampled.

L&R appreciates the opportunity to work with you on this project and looks forward to a continued relationship as your environmental and laboratory consultant. Please do not hesitate to contact our offices at (208) 813-7700 with any questions, comments, or concerns.

Sincerely, The L&R Group, LLC

Conducted by:	Kaya Stahle	Reviewed by:	Richard Vincent
Title:	Asbestos Inspector	Title:	Technical Services Manager

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Limited Asbestos Inspection Report

Section 1 Project Information	
Client/Company Name:	Idaho Division of Public Works
Client Address, City, State, Zip:	502 North 4th Street, Boise, Idaho, 83702
Project Location:	380 W 50 N State Rd Blackfoot, ID
L&R Inspector(s):	Kaya Stahle
L&R Inspection Date:	April 7, 2022
L&R Project #:	220580T
Client #, Client PO, or Insurance #:	2022918

Notes: NA=Not Applicable

Section 2 Requested Project Scope Area(s)	
Client Defined Scope Area(s):	Building B5601, interior, excluding the exterior and roof.
Project Scope:	The client requested this project scope area(s) to include the following: • A detailed visual inspection for the presence of suspect ACM. • Bulk sampling of suspect building materials to identify ACM. • Analysis of the bulk samples by EPA 600/R-93/116 to determine the presence of asbestos.
Onsite Limitations:	• L&R was directed to perform discreet sampling; therefore, some materials containing asbestos may not have been sampled in readily visible locations.

Section 3 Inspection and Sampling Procedures

L&R performed the inspection and testing in accordance with current acceptable industry guidelines, and applicable Federal, State, and Local regulations. Guidelines and procedures for conducting and evaluating the various elements of the inspection are outlined in the following:

- 29 CFR 1926, Section 1101, Asbestos
- Portions of the Asbestos Hazard Emergency Response Act (AHERA), the Asbestos Schools Hazard Abatement Reauthorization Act (ASHARA), and EPA Model Accreditation Program (MAP) as defined by 40 CFR 763; Subpart E, Appendix C
- 40 CFR 61, EPA National Emission Standards for Hazardous Air Pollutants (NESHAP)
- 40 CFR 261, Resource Conservation and Recovery Act (RCRA)

Section 4 Homogeneous Area and Sample Summary

Total # of Sample(s) Collected	16	Total Homogeneous Area(s) Identified	8	Materials Identified or Assumed as ACM	0

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Section 5 Sample Summary and Analytical Results

Homogeneous Area / Sample Number	Sample Material Description	Sample Area Location	Asbestos Content / Type
HA-1 / 1-3	Drywall / joint compound / texture	Conference room, hall to shop, utility room	No Asbestos Detected (NAD)
HA-2 / 4	ACT	Office	NAD
HA-3 / 5-7	Ceiling joint compound / texture	Hall, conference room, bathroom	NAD
HA-4 / 8	Vinyl floor	Utility room	NAD
HA-5 / 9-11	Drywall / joint compound	Downstairs storeroom	NAD
HA-6 / 12	Cove base / mastic	Downstairs storeroom	NAD
HA-7 / 13	Vinyl floor tile / mastic	Downstairs storeroom	NAD
HA-8 / 14-16	Drywall / texture	Shop wall	NAD

Section 6 General Recommendations

For materials that should be presumed as ACM in locations that were not sampled, L&R recommends additional sampling and analysis of these materials prior to disturbance. L&R was limited to discreet sampling for the scope of this project. Prior to abatement activities, L&R recommends additional sampling in areas not included within the scope of this project.

L&R recommends that a certified asbestos worker and/or licensed asbestos contractor experienced in abatement solutions perform the cleanup, removal, and disposal of any ACM prior to demolition, renovation, repair, or restoration of the building.

Section 7 Limitations and Disclaimer

This report was prepared for the use of Client and the conclusions and recommendations presented in this report are based upon the agreed upon scope of work outlined in the report and the Contract for Professional Services between Client and The L&R Group - Technical Services (L&R a.k.a. Inspection Company). Use or misuse of this report, or reliance upon the findings hereof by any parties other than the Client, is at their own risk. Neither Client nor Consultant make any representation of warranty to such other parties as to the accuracy or completeness of this report or the suitability of its use by such other parties for any purpose whatever, known or unknown to Client or Consultant.

L&R cannot warrant or guarantee that our findings represent all possible hazardous materials that may be hidden within the structure or that the information provided is complete or accurate as these environmental methods are limited to the conditions observed at the time of the inspection and the report is limited to the information available at the time it was prepared. There is a possibility that conditions exist that could not be identified within the scope of the inspection or that were not apparent during the inspection. As such, L&R shall not be liable for failure to discover any conditions other than readily apparent and visible.

Certain areas of the structure may be considered inaccessible or impractical to inspect, including but not limited to, the following:

1. areas not readily accessible or deemed unsafe at the discretion of inspector;
2. interior wall and ceiling cavities, portions of the attic / crawlspace concealed or made inaccessible by insulation, equipment or ducting;
3. areas of the attic / crawlspace or roof cavity obscured due to inadequate crawl space.

Whenever feasible, L&R performs limited discreet and destructive sampling techniques and methods. However, L&R cannot guarantee, without the complete deconstruction of structure's components, that hidden hazards or toxic materials are not remaining within the building. Thus, additional sampling may be necessary if demolition, renovation, or repair activities expose previously unidentified building materials or debris. During demolition, renovation or repair activities, a National Emission Standard for Hazardous Air Pollutants (NESHAP) Competent Person must be on site in the event additional materials or hazards are discovered and/or disturbed as outlined in Environmental Protection Agency (EPA) regulations 40 CFR Part 61.

Per Federal, State and Local Regulations, Identify All Possible Hazards Prior To Performing Work. Prior to commencing work activities and/or the removal or disturbance of any building materials, NESHAP and other regulations require that a facility be inspected for

asbestos and other hazardous materials, regardless of age. Building materials that may be disturbed should be assessed for asbestos and lead-based paint hazards and appropriate measures should be followed in accordance with applicable federal, state and local regulations. Asbestos containing products are currently legal to use, install and purchase in the United States. Some common asbestos containing products include but are not limited to: drywall, wall and ceiling textures, joint compounds, flooring materials such as sheet vinyl and floor tiles, cove base, mastics, leveling compounds, insulation, and pipe wraps. Other hazards could include but are not limited to: Lead-based paint, other lead hazards, Mold, Mercury, Nuisance Dust, PCBs, Silica, VOCs.

Federal law 24 CFR part 35 and 40 CFR part 745 also requires seller and lessors of residential units constructed prior to 1978, except housing for elderly (unless any child resides or is expected to reside in such housing) or any zero-bedroom dwelling to disclose and provide a copy of this report to new purchasers or leases before they become obligated under a lease or sales contract. Property owners and sellers are also required to distribute an educational pamphlet approved by the USEPA and include standard warning language in leases or sales contracts to ensure that occupants and parents have the information needed to protect themselves and children from lead-based paint hazards.

For additional laws and regulations pertaining to lead, lead based paint and lead hazards please refer to the EPA's website https://www.epa.gov/lead/lead-laws-and-regulations.

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Section 8 Asbestos Regulations

The EPA regulates the abatement and disposal of asbestos-containing materials from any public or private building involving demolition, renovation, repair, construction, and maintenance activities. The EPA certifies and licenses asbestos-removal contractors, inspects asbestos-abatement projects, and enforces laws regarding the proper removal and disposal of asbestos-containing materials. In addition, the agency provides homeowners education about the dangers of exposure to asbestos and how to deal with asbestos in the home. For additional Asbestos Laws and Regulations please reference the EPA's website https://www.epa.gov/asbestos/asbestos-laws-and-regulations.

EPA 40 CFR 763 – Describes response actions, operations and maintenance, training and periodic surveillance, management plans, recordkeeping, warning labels, as well as compliance and enforcement.
EPA 40 CFR 61.145 – Provides standards for demolition, renovation and thorough inspection requirements.
EPA 40 CFR 61, Subpart M NESHAP – Covers National Emission Standards for Hazardous Air Pollutants.

OSHA is responsible for establishing standards to protect the health and safety of workers who may be exposed to asbestos. OSHA sets out several provisions' employers must follow to comply with the asbestos standard such as exposure limits and guidelines for exposure monitoring, medical surveillance, record keeping, regulated areas, and communication of hazards. For additional resources and information please reference OSHA's website at https://www.osha.gov/SLTC/asbestos/.

- For regulations pertinent to worker protection - OSHA Asbestos Construction Standard 29 CFR 1926.1101, or the Asbestos Worker Protection Rule at 40 CFR 763.120, whichever is applicable.
- OSHA 29 CFR 1926.1101 – Construction Standard applies to building demolition and renovation operations and other activities where asbestos is removed or encapsulated. It also covers building maintenance and emergency cleanup of asbestos.
- OSHA 29 CFR 1910.1001 – General Industry Standard covers maintenance work and routine housekeeping activities.
- OSHA 29 CFR 1910.134 – Provides Respiratory Protection Standards.
- OSHA 3151-12R and 1910-1001(H) – Personal protection equipment selection and reference.

Additional regulations may apply:

- Client and contractor should read and understand the details in 1926.1101(k)(1i) and section k in general.
- Client and contractor must understand their responsibilities to perform due diligence prior to the commencement of work or disturbance, i.e., to identify and communicate the presence (or assumed presence), location and quantity of ACM.
- General Industry Standard (29 CFR 1910.1001) (j)(3) - Duties of employers and building and facility owners.
- 1910.1001(j)(3)(i) - Building and facility owners shall determine the presence, location, and quantity of ACM and/or PACM at the work site. Employers and building and facility owners shall exercise due diligence in complying with these requirements to inform employers and employees about the presence and location of ACM and PACM.
- 1910.1001(j)(3)(ii) - Building and facility owners shall maintain records of all information required to be provided pursuant to this section and/or otherwise known to the building owner concerning the presence, location and quantity of ACM and PACM in the building/facility. Such records shall be kept for the duration of ownership and shall be transferred to successive owners.
- 1910.1001(j)(3)(iii) - Building and facility owners shall inform employers of employees, and employers shall inform employees who will perform housekeeping activities in areas which contain ACM and/or PACM of the presence and location of ACM and/or PACM in such areas which may be contacted during such activities.

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Appendix A

Terms/Acronym	Definition
ACBM	Asbestos Containing Building Materials (surfacing, TSI or miscellaneous ACM within a building.
ACM	Asbestos Containing Material containing greater than 1% asbestos.
Acoustical Material	Material often containing asbestos, perlite, vermiculite, etc. applied to ceilings or walls to dampen sound.
Action Level	An OSHA standard for asbestos exposure. Action level means an airborne concentration of asbestos above which an employer must institute certain provisions (see 29 CFR 1926.58). The Action Level has been eliminated by OSHA as of October 1994 (see 29CFR 1926.1101).
Adequately Wetted	Sufficiently mixed or coated with water of an aqueous solution to prevent the release of particulates. If visible emissions are observed coming from asbestos containing material, then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet.
AHERA	Asbestos Hazard Emergency Response Act of 1986.
Air Plenum	Space above a ceiling used for the circulation of air through a building.
Air Samples	Samples of airborne fibers taken by drawing air through a filter to trap the airborne fibers. Analyzed by PCM or electron microscopy.
Amosite	Brown asbestos, brittle fibers, high resistance to heat.
APR	Air purifying respirator.
ASHAA	Asbestos School Hazard Abatement Act of 1984.
Asbestos	A term used to define a group of naturally occurring silicate minerals, occurring as parallel bundles of fibers, called "fibrils".
Asbestos Management Plan	A document to assist in administering the asbestos programs in a facility.
Asbestosis	A chronic disease during which the lungs become scarred as a result of a biological reaction to the inhalation of asbestos fibers.
Assumed ACM	Assumed or suspected asbestos containing material.
Category I Nonfriable ACM	An asbestos containing packing, gasket, resilient floor covering, and asphalt roofing product containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy.
Category II Nonfriable ACM	Any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.
CFR	Code of Federal Regulations.
Chrysotile	White asbestos, fine silky fibers, flexible with high tensile strength.
Competent Person	A competent person is one capable of identifying existing asbestos hazards in the workplace and who has the authority to take a corrective action. Duties include establishing the negative-pressure enclosure, controlling entry and exit of all employees, etc. The competent person must be trained in all aspects of asbestos abatement and the contents of the OSHA asbestos standard.
Condition Factors	Describe the physical condition ACM.
Control Options	Methods of reducing or eliminating the exposure potential of asbestos-containing materials e.g. removal, enclosure, encapsulation, operations and maintenance.
Corrugated Paper	A type of thermal insulation characterized by brown "cardboard box" type corrugated paper wrapped around pipes or applied in sheets to boilers and tanks. Usually contains woven asbestos with paper.
Corrective Action	An activity undertaken to reduce or eliminate the exposure potential of ACM: enclosure, encapsulation, removal, or operations and maintenance.
Crawl Space	The area of the building below the ground floor, but above the ground, often only a few feet high.
Demolition	The wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning of a building.
Doffing	The process of taking off personal protective equipment.
Donning	The process of putting on personal protective equipment.
Emergency Renovation	A renovation operation that was not planned, but results from a sudden, unexpected event. This term includes operation necessitated by nonroutine failures of equipment.
Encapsulation	Treatment of ACM with a material that surrounds or embeds the asbestos fibers in an adhesive matrix to prevent the release of fibers as the encapsulant creates a membrane over the surface (bridging encapsulant) or penetrates the material and binds its components together (penetrating encapsulant).
Enclosure	Construction of an airtight, impermeable, permanent barrier around ACM to control the release of fibers into the air.

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Exposure	A quantification of the population at risk and the magnitude and duration of their exposure.
EPA	Environmental Protection Agency. The agency charged with implementing AHERA.
Facility	Any institutional, commercial, public, industrial, or residential structure, installation, or building (including any structure, installation, or building containing condominiums or individual dwelling units operated as a residential cooperative, but excluding residential buildings having four or fewer dwelling units); any ship; and any active or inactive waste disposal site. For purposes of this definition, any building, structure, or installation that contains a loft used as a dwelling is not considered a residential structure, installation, or building. Any structure, installation or building that was previously subject to this subpart is not excluded, regardless of its current use or function.
Facility Component	Any Pipe, duct, boiler, tank, reactor, turbine, or furnace at or in a facility; or any structural member of a facility.
f/cc	Fibers per cubic centimeter. A measurement to express the level of fibers in the air.
Fiber Release Episode	Any uncontrolled or unintentional disturbance of ACM resulting in visible emissions.
Fibrils	A small bundle of individual fibers.
Fireproofing	Material sprayed onto building structural members to prevent or retard their loss of strength in case of fire. Often contains asbestos.
Fit-Testing	The act of ensuring a respirator has a proper seal to the wearers face and works properly.
Friable	Easily reduced to powder by hand pressure when dry.
Friable Asbestos Material	Any material containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy that, when dry, can be crumbled pulverized, or reduced to powder by hand pressure.
Functional Space	A room or area designated by a person accredited to prepare management plans.
Glove Bag	A device used to remove small sections of asbestos.
Grinding	Means to reduce to powder or small fragments and includes mechanical chipping or drilling.
Hazard	A circumstance, mechanism, or event which was the potential to create injury.
HEPA	High Efficiency Particulate Air.
Homogeneous Area	An area of asbestos-containing material where the material is consistent in texture, color, and age.
In Poor Condition	Means the binding of the material is losing its integrity as indicated by peeling, cracking, or crumbling of the material.
Inadvertent Contamination	The disturbance of asbestos containing products not caused intentionally by the parties involved in the project.
Inspection	The process of locating ACM, determining its condition, and reporting the results.
Latency	Period before the presence of a disease is manifested by symptoms.
LEA	Local Education Agency, generally a school district.
Liability	Legally bound or obligated.
Magnesia	A type of thermal insulation, generally white fibrous material pre-formed into shaped pieces or as bricks, often contains asbestos.
Mechanical Area	An area of building not normally accessed by the public containing air handling, air conditioners, heat exchanges, tanks, pipes, or other mechanical equipment.
Mechanical System	The heating, ventilation, air conditioning, and plumbing components of a facility.
Medical Surveillance Program	A program to ensure workers are physically and psychologically able to wear a respirator and perform asbestos activities.
Miscellaneous Material	Interior building material on structural components, structural members or fixtures, that does not include thermal or surfacing material.
Mudded Joint Fittings	Plaster compound packed onto pipe joints and around valves, pumps, elbows, tees for thermal insulation. Often contains asbestos.
NESHAP	National Emission Standards for Hazardous Air Pollutants.
NIOSH	National Institute of Occupational Safety and Health. The agency who sets standards for respirators and other protective equipment.
Negative Air	A process by which air is continually removed from the work area to keep the air pressure in the work area less than the air pressure outside the work area. A registered trademark.
Nonfriable ACM	Means any material containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.
Not Part of Scope	Area never defined as work area, or area excluded from work area.
O & M	Operations and Maintenance.
OSHA	Occupational Safety and Health Administration. The agency responsible for protecting worker health and safety.
Outside Air	The air outside buildings and structures.

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Outside of Scope	Material may within defined scope area, but material sampling was not defined as part of scope.
Owner/Operator Demolition or Renovation	Means any person who owns, leases, operates, controls, or supervised the facility being demolished. or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.
Packing	Material applied to tanks, boilers, ducts, air handlers for thermal insulation. Often contains asbestos.
PACM	Presumed Asbestos Containing Material (PACM): All TSI, Surfacing & resilient flooring in buildings construction prior to 1981, must be presumed to be ACM, and must be treated as ACM.
PAPR	Powered Air Purifying Respirator.
PCM	Phase Contrast Microscopy. A method used to analyze air samples for the presence of fibers.
PEL	Permissible Exposure Limit, a level of airborne asbestos above which no employee shall be exposed. The PEL is 0.1 f/cc of air as an 8-hour time-weighted average (see 29 CFR 1926.1101).
Planned Renovation	A renovation operation, or a number of such options, in which the amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted. Individual nonscheduled operations are included if a number of such operations can be predicted to occur during a given period of time based on operating experience.
PLM	Polarized Light Microscopy. A method used to analyze bulk samples for the presence of asbestos.
PPE	Personal protective equipment is equipment worn to minimized exposure to hazards that could cause serious injury or illnesses.
RACM	Regulated Asbestos Containing Materials a) Friable asbestos material, b) Category I nonfriable ACM that has become friable, c) Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or d) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces, expected become friable in the course of demolition, renovation or removal operations regulated by this subpart.
Regulated Areas	Areas that exceed or may exceed airborne concentrations beyond permissible exposure limits of 0.1 f/cc.
Reinspection	A periodic reevaluation of the ACM over a regular time period.
Removal	Taking out or stripping of substantially all ACM from a damage area, functional space, or homogeneous area.
Renovation	Altering in any way one or more facility components. Operations in which load-supporting structural members are wrecked or taken out are excluded.
Repair	Returning damaged ACM to an undamaged condition or to an intact state so as to contain fiber release.
Respiratory Protection Program	A program to provide the information, training, and equipment necessary for proper respiratory protection while working with ACM.
Response Action	A method, including removal, encapsulation, enclosure, repair, and operation and maintenance, that protects human health and the environment from friable ACBM.
Routine Maintenance Area	An area, such as a boiler room or mechanical room, not normally frequented by the public in which maintenance employees or contract workers regularly conduct maintenance activities.
Salient	A limited area of significantly different material condition within a homogeneous area.
SEM	Scanning Electron Microscopy. A method to analyze air samples for the presence of asbestos.
Service Personnel	People engaged in repair, maintenance, and/or custodial activities.
Structural System	The system of beams, walls, piers, and such that supports a building.
Surfacing Material	Material in a building that is either sprayed-on, troweled-on, or otherwise applied to surfaces such as acoustical plaster on ceilings and fireproofing material on structural members, or other materials used for acoustical, fireproofing, or other purposes. Often contains asbestos.
Symbols	Drawn figures which represent real objects. Symbols are the "short-hand" of architectural and mechanical drawings.
TEM	Transmission Electron Microscopy. A method to analyze air samples or bulk samples for the presence of asbestos.
Thermal System Insulation	Material in a building applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior mechanical components to prevent heat loss or gain, or water condensation, or for any other purpose.
Tradesmen	People engaged in the construction trade, i.e. electricians, plumbers, carpenters, painters, etc.
TSCA	Toxic Substances Control Act.
TWA	Time Weighted Average. An average concentration of material over a set period of time.
"Tyvek"	Brand name of DuPont for a disposable clothing worn during asbestos work.
Visible Emissions	Any emissions containing particulate asbestos material that area visually detectable without the aid of instruments.
Wet Cleaning	A cleaning technique where the material is kept wet and/or wet towels or mops are used to reduce the potential for material becoming airborne.
Wrapped Paper	A type of thermal insulation characterized by layers of Kraft paper wrapped around pipes. There is usually a layer of woven asbestos paper or "tar" paper imbedded with asbestos.

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Appendix B

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ENVIRONMENTAL + LABORATORIES

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Attention: Idaho Division of Public Works
PO Box 83720
Boise ID 83720

Project: Blackfoot Shed 50N 380W
Blackfoot, Id

Received Date: 04/08/2022
Analysis Date: 04/12/2022
Phone: 208-322-1908

LIMS ID: 22040812
L&R Client ID: 1016
L&R Project ID: 220580T
Analyst: Noah Poulin

Analysis of Bulk Materials using Polarized Light Microscopy (EPA Method 600/R-93/116)

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
1-1 22040812.01	JC/Tex	Joint Compound / Texture, Fibrous, Soft, Homogenous / Tan/White	2% Cellulose	98% Other	None Detected
Comment :					
1-2 22040812.02	Drywall/JC/Tex	Drywall/Texture/Joint Compound, Fibrous, Soft, Homogenous / Brown/Tan/White	10% Cellulose	90% Other	None Detected
Comment :					
1-3 22040812.03	Drywall/JC/Tex	Drywall/Texture/Joint Compound, Fibrous, Soft, Homogenous / Brown/Tan/White	10% Cellulose	90% Other	None Detected
Comment :					
2-4 22040812.04	ACT	Ceiling Tile, Fibrous, Soft, Homogenous / Gray/Tan/White	60% Cellulose 20% Fiberglass	20% Other	None Detected
Comment :					
3-5 22040812.05	Ceiling JC/Tex	Ceiling Texture, Fibrous, Soft, Homogenous / Tan	2% Cellulose	98% Other	None Detected
Comment :					
3-6 22040812.06	Ceiling JC/Tex	Ceiling Texture, Fibrous, Soft, Homogenous / Tan	2% Cellulose	98% Other	None Detected
Comment :					
3-7 22040812.07	Ceiling JC/Tex	Ceiling Texture, Fibrous, Soft, Homogenous / Tan	2% Cellulose	98% Other	None Detected
Comment :					
4-8 22040812.08	Vinyl floor	Vinyl Floor , Fibrous, Firm, Layered / Black/Gray	5% Synthetic Fiber	95% Other	None Detected
Comment :					
5-9 22040812.09	Drywall/JC	Drywall/Joint Compound, Fibrous, Soft, Homogenous / Brown/Tan/White	5% Cellulose	95% Other	None Detected
Comment :					
5-10 22040812.10	Drywall	Drywall, Fibrous, Soft, Homogenous / Brown/Tan/White	5% Cellulose	95% Other	None Detected
Comment :					

Analyst : **Noah Poulin**

Reviewed By: **Kaya Stahle**

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Attention: Idaho Division of Public Works
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Boise ID 83720

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Analysis of Bulk Materials using Polarized Light Microscopy (EPA Method 600/R-93/116)

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
5-11 22040812.11	Joint compound	Joint Compound, Fibrous, Soft, Homogenous / White	2% Cellulose	98% Other	None Detected
Comment :					
6-12 22040812.12	Cove base/mastic	Cove Base & Mastic, Fibrous, Firm, Layered / Brown/Yellow	3% Synthetic Fiber	97% Other	None Detected
Comment :					
7-13 22040812.13	Vinyl floor tile/mastic 12x12	Vinyl Floor Tile and mastic, Fibrous, Firm, Layered / White/Yellow	5% Synthetic Fiber	95% Other	None Detected
Comment :					
8-14 22040812.14	Drywal/texture	Drywall/texture, Fibrous, Soft, Homogenous / Brown/Tan/White	10% Cellulose	90% Other	None Detected
Comment :					
8-15 22040812.15	Drywall/texture	Drywall/texture, Fibrous, Soft, Homogenous / Brown/Tan/White	10% Cellulose	90% Other	None Detected
Comment :					
8-16 22040812.16	Drywall/texture	Drywall/texture, Fibrous, Soft, Homogenous / Brown/Tan/White	10% Cellulose	90% Other	None Detected
Comment :					

Analyst : **Noah Poulin**

Reviewed By: **Kaya Stahle**

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Contact Information

Company Name/Address: DPW

L&R Project Number (L&R Use): 220580+ 240812

Report to (Name and Email): kaya@tlr.group

Special Instruction:

Project Name and Address: Blackfoot Shed 50N 380W Blackfoot, ID

Phone Number:

Collected by (Print): Kaya Stahel

Number of Samples: 16

*Samples received after 2 p.m. will be considered received the next business day

Positive Stop ☐	Mold Turn Around		Lead Turn Around		Asbestos Turn Around	
	3 Hours	☐	24 Hours	☐	3 Hours	☐
	24 Hours	☐	3-5 Days	☐	24 Hour	☐
	3-5 Days	☐	Subcontract	☐	3-5 Days	☑

Sample Information

Sample ID	Description / Location	Volume / Area	Requested Services: Asbestos Bulk Analysis PLM	Asbestos Air Analysis PCM	Lead Bulk	Lead Paint Chip	Mold Spore Trap	Mold Direct Exam Bulk	Other:
1-1	JC/Tex	conference room	☑	☐	☐	☐	☐	☐	☐
1-2	Drywall/JC/Tex	hall to shop	☑	☐	☐	☐	☐	☐	☐
1-3	Drywall/JC/Tex	utility room	☑	☐	☐	☐	☐	☐	☐
2-4	ACT	office	☑	☐	☐	☐	☐	☐	☐
3-5	Ceiling JC/Tex	hall	☑	☐	☐	☐	☐	☐	☐
3-6	Ceiling JC/Tex	conference room	☑	☐	☐	☐	☐	☐	☐
3-7	Ceiling JC/Tex	bathroom	☑	☐	☐	☐	☐	☐	☐
4-8	Vinyl floor	utility room	☑	☐	☐	☐	☐	☐	☐
5-9	Drywall/JC	downstairs store rm	☑	☐	☐	☐	☐	☐	☐
5-10	Drywall	downstairs store rm	☑	☐	☐	☐	☐	☐	☐
5-11	JC	downstaris store rm	☑	☐	☐	☐	☐	☐	☐
6-12	Cove base/mastic	downstairs store rm	☑	☐	☐	☐	☐	☐	☐
7-13	Vinyl floor tile/mastic 12x12	downstaires store rm	☑	☐	☐	☐	☐	☐	☐
8-14	Drywall/Tex	shop wall	☑	☐	☐	☐	☐	☐	☐
8-15	Drywall/Tex	shop wall	☑	☐	☐	☐	☐	☐	☐

*By signing this document, you are agreeing to the terms stated on the back of this form.

Submitted by: Kaya Stahle (Print and Signature) **Date/Time:** 4/8/2022 13:41

Received by: Q. McClellan **Date/Time:** 4.8.22 1:41

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Meridian, Idaho 83642
(208) 813-7700 www.tlr.group

Contact Information

Company Name/Address: DPW

L&R Project Number (L&R Use):

Report to (Name and Email): kaya@tlr.group

Special Instruction:

Project Name and Address: Blackfoot Shed 50N 380W Blackfoot, ID

Phone Number:

Positive Stop ☑

Mold Turn Around		Lead Turn Around		Asbestos Turn Around	
3 Hours	☐	24 Hours	☐	3 Hours	☐
24 Hours	☐	3-5 Days	☐	24 Hour	☐
3-5 Days	☐	Subcontract	☐	3-5 Days	☑

Collected by (Print): Kaya Stahle

Number of Samples: 16

**Samples received after 2 p.m. will be considered received the next business day*

Sample Information

Sample ID	Description / Location	Volume / Area	Asbestos Bulk Analysis PLM	Asbestos Air Analysis PCM	Lead Bulk	Lead Paint Chip	Mold Spore Trap	Mold Direct Exam Bulk	Other:
8-16	Drywall/Tex	shop wall	☑	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐
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(Requested Services: Asbestos — Asbestos Bulk Analysis PLM, Asbestos Air Analysis PCM; Lead — Lead Bulk, Lead Paint Chip; Mold — Mold Spore Trap, Mold Direct Exam Bulk; Other)

**By signing this document, you are agreeing to the terms stated on the back of this form.*

Submitted by: Kaya Stahle [signature] (Print and Signature) **Date/Time:** 4/8/2022 1341

Received by: D. McClellan [signature] **Date/Time:** 4.8.22 1:41

THE L&R GROUP

680 South Progress Avenue, Suite 2A
Meridian, Idaho 83642
208-813-7700
www.tlr.group

Appendix C

680 South Progress Avenue, Suite 2A
Meridian, Idaho 83642
208-813-7700
www.tlr.group

1) Conference room-Samples 1-1 and 3-6 were taken from here-No ACM

2) Hall to locker and bathroom, and outside and office-Samples 1-2 and 3-5 were taken from here-No ACM

3) Utility room-Samples 1-3 and 4-8 were taken from here-No ACM

4) Bathroom-Sample 3-7 was taken from here-No ACM

THE L&R GROUP

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Appendix D

IHR

Protecting Your Workers

Certificate of Completion

Kaya Stahle

Has attended and successfully completed the
Asbestos Building Inspector
AHERA 24 Hours Initial Training Course
In accordance with Title II of TSCA
40 CFR Part 763, Appendix C to Subpart E
Consistent with Utah Administrative Rule R307-801: Asbestos

Course Date: March 7-9, 2022
Certificate Number: 6863-03
Expiration Date: March 9, 2023

Instructor: Dayle Lundy

Industrial Hygiene Resources – 8312 W. Northview, Suite 100 – Boise, Idaho 83704
Tel: (208) 323-8287 | Fax: (208) 323-0783 | www.industrialhygieneresourcescom

GEOTECHNICAL INVESTIGATION

BLACKFOOT MAINTENANCE BUILDING EXPANSION

46 North 350 West
Blackfoot, ID

PREPARED FOR:

Mr. Travis Frei
Idaho Transportation Department
206 North Yellowstone Highway
Rigby, ID 83442

PREPARED BY:

Atlas Technical Consultants, LLC
450 East Day Street, Suite B
Pocatello, ID 83201

January 19, 2023
P222393g

ATLAS

450 East Day Street, Suite B
Pocatello, ID 83201
(208) 233-9500 | oneatlas.com

January 19, 2023

Atlas No. P222393g

Mr. Travis Frei
Idaho Transportation Department
206 North Yellowstone Highway
Rigby, ID 83442

Subject: Geotechnical Investigation – Revised 1
Blackfoot Maintenance Building Expansion
46 North 350 West
Blackfoot, ID

Dear Mr. Frei:

In compliance with your instructions, Atlas has conducted a soils exploration and foundation evaluation for the above referenced development. Fieldwork for this investigation was conducted on October 27, 2022. Data have been analyzed to evaluate pertinent geotechnical conditions. Results of this investigation, together with our recommendations, are to be found in the following report. We have provided a PDF copy for your review and distribution. This report has been revised to reflect the actual loading of the structures that was not provided previously.

Often, questions arise concerning soil conditions because of design and construction details that occur on a project. Atlas would be pleased to continue our role as geotechnical engineers during project implementation.

If you have any questions, please call us at (208) 233-9500.

Respectfully submitted,

PROFESSIONAL ENGINEER LICENSED 18739 1/19/2023 STATE OF IDAHO ETHAN SALOVE

Ethan Salove, PE
Geotechnical Engineer

Monica Saculles, PE
Senior Geotechnical Engineer

Keaton Ward
Staff Geologist

ATLAS

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TABLES

APPENDICES

ATLAS

1. INTRODUCTION

This report presents results of a geotechnical investigation and analysis in support of data utilized in design of structures as defined in the 2018 International Building Code (IBC). Information in support of groundwater and stormwater issues pertinent to the practice of Civil Engineering is included. Observations and recommendations relevant to the earthwork phase of the project are also presented. Revisions in plans or drawings for the proposed structures from those enumerated in this report should be brought to the attention of the soils engineer to determine whether changes in the provided recommendations are required. Deviations from noted subsurface conditions, if encountered during construction, should also be brought to the attention of the soils engineer.

1.1 Project Description

The proposed development is in the northwestern portion of the City of Blackfoot, Bingham County, ID, and occupies a portion of the SW¼NW¼ of Section 33, Township 2 South, Range 35 East, Boise Meridian. The site to be developed is approximately 2.1 acres. This project will consist of a new Brine Facility and expansion of the existing maintenance building by 15 feet. Total settlements are limited to 1 inch. Loads of up to 3,000 pounds per lineal foot for wall footings, and column loads of up to 200,000 pounds were provided by Frost Structural Engineering for settlement calculations. Additionally, paved areas will be developed for the project. Assumptions have been made for traffic loading of pavements. Retaining walls are not anticipated as part of the project.

1.2 Authorization

Authorization to perform this exploration and analysis was given in the form of a written authorization to proceed from Mr. Travis Frei of Idaho Transportation Department to Jacob Schlador of Atlas Technical Consultants (Atlas), on October 19, 2022. Said authorization is subject to terms, conditions, and limitations described in the Professional Services Contract entered into between Idaho Transportation Department and Atlas. Our scope of services for the proposed development has been provided in our proposal dated October 13, 2022 and repeated below.

1.3 Scope of Investigation

The scope of this investigation included review of geologic literature and existing available geotechnical studies of the area, visual site reconnaissance of the immediate site, subsurface exploration of the site, field and laboratory testing of materials collected, and engineering analysis and evaluation of foundation materials.

2. SITE DESCRIPTION

2.1 Site Access

Access to the site may be gained via Interstate 15 to the Blackfoot exit. Proceed northwest on US 26 for approximately 0.55 mile to its intersection with North 350 West Road. From this intersection, proceed north on North 350 West 0.10 mile to West 50 North, then continue west for 0.10 mile to arrive at the site which is directly north of the road. The location is depicted on site maps included in the **Appendix**.

2.2 Regional Geology

The subject site is located in the City of Blackfoot, in an area known as the Snake River Plain. Sediments deposited here were derived from Cretaceous sediments from the Blackfoot Mountains, which are immediately east of the Snake River Plain. These sediments compose the underlying horizons throughout the region. Surficial sediments were deposited as mixed alluvium during the Tertiary Period (1.6 to 66 million years ago) and generally consist of weakly to moderately indurated gravels, cobbles, and sand lenses underlying sandy silts and silty clays. Since their deposition, these have been dissected in the Blackfoot area (Alt and Hyndman, 1998).

2.3 General Site Characteristics

The site to be developed consists of 2.1 acres of relatively flat and level land. Currently, three commercial structures, storage tanks, a fueling station are in place within the fenced project site. Commercial vehicles, equipment, and waste are located throughout the site. Fill stockpiles are in the northcentral portion of the site. Existing asphalt is present surrounding the larger shop area in the southwest corner of the project site. The remainder of the project site is composed of undeveloped land. Existing commercial property is present along the west and south borders across W 50 N and Rowe Road, respectively. Residential properties are present across Man Waring Road to the north of the project. Vegetation on the site consists primarily native weeds and grasses along the eastern edge of the fenced in portion of the property.

Regional drainage is south toward the Snake River. Stormwater drainage for the site is achieved by both sheet runoff and percolation through surficial soils. Runoff predominates for the paved areas while percolation prevails across the remaining portions of the site. The site is situated so that it is unlikely that it will receive any drainage from off-site sources. Stormwater drainage collection and retention systems are in place within the current paved areas in the form of drop inlet systems.

2.4 Regional Site Climatology and Geochemistry

According to the Western Regional Climate Center, the average precipitation for the Blackfoot area is on the order of 7 to 25 inches per year, with an annual snowfall of approximately 27 inches. The monthly mean daily temperatures range from 21°F to 96°F, with daily extremes ranging from -15°F to 98°F. Winds are generally from the southwest with an annual average wind speed of approximately 11 miles per hour. Soils and sediments in the area are primarily derived from siliceous materials and exhibit low electro-chemical potential for corrosion of metals or concretes. Local aggregates are generally appropriate for Portland cement and lime cement mixtures. Surface water, groundwater, and soils in the region typically have pH levels ranging from 7.4 to 8.4.

3. SEISMIC SITE EVALUATION

3.1 Geoseismic Setting

Soils on site are classed as Site Class D in accordance with Chapter 20 of the American Society of Civil Engineers (ASCE) publication ASCE/SEI 7-16. Structures constructed on this site should be designed per IBC requirements for such a seismic classification. Our investigation did not reveal hazards resulting from potential earthquake motions including: slope instability, liquefaction, and surface rupture caused by faulting or lateral spreading. Incidence and anticipated acceleration of seismic activity in the area is low.

3.2 Seismic Design Parameter Values

The United States Geological Survey National Seismic Hazard Maps (2008), includes a peak ground acceleration map. The map for 2% probability of exceedance in 50 years in the Western United States in standard gravity (g) indicates that a peak ground acceleration of 0.23 is appropriate for the project site based on a Site Class D.

The following section provides an assessment of the earthquake-induced earthquake loads for the site based on the Risk-Targeted Maximum Considered Earthquake (MCE_R). The MCE_R spectral response acceleration for short periods, S_{MS}, and at 1-second period, S_{M1}, are adjusted for site class effects as required by the 2018 IBC. Design spectral response acceleration parameters as presented in the 2018 IBC are defined as a 5% damped design spectral response acceleration at short periods, S_{DS}, and at 1-second period, S_{D1}.

The USGS National Seismic Hazards Mapping Project includes a program that provides values for ground motion at a selected site based on the same data that were used to prepare the USGS ground motion maps. The maps were developed using attenuation relationships for soft rock sites; the source model, assumptions, and empirical relationships used in preparation of the maps are described in Petersen and others (1996).

Table 1 – Seismic Design Values

Seismic Design Parameter	Design Value
Site Class	D "Default"
S_s	0.356 (g)
S_1	0.132 (g)
F_a	1.515
F_v	2.337
S_{MS}	0.540
S_{M1}	0.307
S_{DS}	0.360
S_{D1}	0.205

4. SOILS EXPLORATION

4.1 Exploration and Sampling Procedures

Field exploration conducted to determine engineering characteristics of subsurface materials included a reconnaissance of the project site and investigation by soil boring. Borings were located in the field by means of visual approximation from on-site features or known locations and are presumed to be accurate to within a few feet. Borings were advanced by means of a truck-mounted drilling rig equipped with continuous flight hollow-stem augers. At specified depths, samples were obtained using a standard split-spoon sampler and Standard Penetration Test (SPT) blow counts were recorded. Uncorrected SPT blow counts are provided on logs, which can be found in the **Appendix**. Delayed water level observations were made in open borings to evaluate groundwater levels. At completion of exploration, borings were backfilled with loose excavated materials and bentonite holeplug.

Samples have been visually classified in the field by professional staff, identified according to boring number and depth, placed in sealed containers, and transported to our laboratory for additional testing. Subsurface materials have been described in detail on logs provided in the **Appendix**. Results of field and laboratory tests are also presented in the **Appendix**. Atlas recommends that these logs **not** be used to estimate fill material quantities.

4.2 Laboratory Testing Program

Along with our field investigation, a supplemental laboratory testing program was conducted to determine additional pertinent engineering characteristics of subsurface materials necessary in an analysis of anticipated behavior of the proposed structures. Laboratory tests were conducted in accordance with current applicable American Society for Testing and Materials (ASTM) specifications, and results of these tests are to be found in the **Appendix**. The laboratory testing program for this report included: Atterberg Limits Testing – ASTM D4318, Grain Size Analysis – ASTM C117/C136.

4.3 Soil and Sediment Profile

The profile below represents a generalized interpretation for the project site. Note that on site soils strata, encountered between boring locations, may vary from the individual soil profiles presented in the logs, which can be found in the **Appendix**.

Asphaltic concrete and sandy gravel fill materials were encountered at ground surface. Fill materials were noted to be brown, dry, loose, with fine to coarse-grained sand and fine to coarse gravels. Beneath existing pavement and fill materials, silt with sand was encountered. These soils were brown, dry to slightly moist, soft to stiff, with fine to coarse-grained sand and trace fine gravel. At depth, poorly graded sand with gravel sediments were exposed. Poorly graded sands were brown, dry, loose to very dense, with fine to coarse-grained sand and fine gravel.

During excavation, boring sidewalls were generally stable. However, moisture contents will affect wall competency with saturated soils having a tendency to readily slough when under load and unsupported.

4.4 Volatile Organic Scan

No environmental concerns were identified prior to commencement of the investigation. Therefore, soils obtained during on-site activities were not assessed for volatile organic compounds by portable photoionization detector. Samples obtained during our exploration activities exhibited no odors or discoloration typically associated with this type of contamination. No groundwater was encountered.

5. SITE HYDROLOGY

Existing surface drainage conditions are defined in the **General Site Characteristics** section. Information provided in this section is limited to observations made at the time of the investigation. Either regional or local ordinances may require information beyond the scope of this report.

5.1 Groundwater

During this field investigation, groundwater was not encountered in borings advanced to a maximum depth of 16.5 feet bgs. Soil moistures in the borings were generally dry to slightly moist throughout. In the vicinity of the project site, groundwater levels are controlled in large part by the stage and flow of the Snake River. Maximum groundwater elevations likely occur during the during late spring to early summer runoff season. Atlas has previously performed a geotechnical investigation within 0.50 mile of the project site in which groundwater was not encountered to a depth of 12.0 feet bgs. Furthermore, according to Idaho Department of Water Resources monitoring well data within approximately ½-mile of the project site, groundwater was measured at depths ranging between 15 and 50 feet bgs.

Based on evidence of this investigation and background knowledge of the area, Atlas estimates groundwater depths to remain greater than approximately 15 feet bgs throughout the year. However, as the site is heavily influenced by the Snake River, flooding or near flooding conditions will result in temporarily higher groundwater elevations.

5.2 Soil Infiltration Rates

Soil permeability, which is a measure of the ability of a soil to transmit a fluid, was not tested in the field. Given the absence of direct measurements, for this report an estimation of infiltration is presented using generally recognized values for each soil type and gradation. Of soils comprising the generalized soil profile for this study, silt with sand soils will commonly exhibit infiltration rates of less than 2 inches per hour. Poorly graded sand with gravel sediments typically exhibit infiltration values in excess of 12 inches per hour. Infiltration testing is generally not required within these sediments because of their free-draining nature.

It is recommended that infiltration facilities constructed on the site be extended into native poorly graded sand with gravel sediments. Excavation depths of approximately 5 to 6 feet bgs should be anticipated to expose these poorly graded sand with gravel sediments. Because of the high soil permeability, ASTM C33 filter sand, or equivalent, should be incorporated into design of infiltration facilities. An infiltration rate of 8 inches per hour should be used in design. Actual infiltration rates should be confirmed at the time of construction.

6. FOUNDATION AND SLAB DISCUSSION AND RECOMMENDATIONS

Various foundation types have been considered for support of the proposed structures. Two requirements must be met in the design of foundations. First, the applied bearing stress must be less than the ultimate bearing capacity of foundation soils to maintain stability. Second, total and differential settlement must not exceed an amount that will produce an adverse behavior of the superstructure. Allowable settlement is usually exceeded before bearing capacity considerations become important; thus, allowable bearing pressure is normally controlled by settlement considerations.

Considering subsurface conditions and the proposed construction, it is recommended that the structure be founded upon conventional spread footings and continuous wall footings. Loads of up to 3,000 pounds per lineal foot for wall footings, and column loads of up to 200,000 pounds were provided by Frost Structural Engineering for settlement calculations. Total settlements should not exceed 1 inch if the following design and construction recommendations are observed.

6.1 Foundation Design Recommendations

Based on data obtained from the site and test results from various laboratory tests performed, Atlas recommends the following guidelines for the net allowable soil bearing capacity:

Table 2 – Soil Bearing Capacity – Walls

Footing Depth	ASTM D1557 Subgrade Compaction	Net Allowable Soil Bearing Capacity
Footings must bear on at least 1 foot of compacted structural fill placed on compacted native silt soils. Existing fill materials must be completely removed from below foundation elements.[1] Excavation depths ranging from roughly 1.5 to 2 feet bgs should be anticipated to expose proper bearing soils.[2]	95% for Native Soils and Structural Fill	2,000 lbs/ft^2

[1]It will be required for Atlas personnel to verify the bearing soil suitability for each structure at the time of construction. [2]Depending on the time of year construction takes place, the subgrade soils may be unstable because of high moisture contents. If unstable conditions are encountered, over-excavation and replacement with granular structural fill and/or use of geotextiles may be required.

Table 3 – Soil Bearing Capacity - Columns

Footing Depth	ASTM D1557 Subgrade Compaction	Net Allowable Soil Bearing Capacity
Footings must bear on compacted structural fill placed on competent, undisturbed, native poorly graded sand with gravel sediments. Existing fill materials and silt soils must be completely removed from below foundation elements.[1] Excavation depths of roughly 5 feet bgs should be anticipated to expose proper bearing soils.[2]	Not Required for Native Soils 95% for Structural Fill	4,000 lbs/ft^2
Footings must bear on at least 1.5 feet of compacted structural fill (ISPWC Type 1 crushed aggregate base) reinforced with two layers of Tensar TX 160 geogrid. Geogrid reinforced fill must bear on compacted, native silt with sand soils.[1] The exposed subgrade should be prepared as follows: 1. Six inches of structural fill[2] should be placed over the compacted native silt soils and be compacted to at least 95% of the maximum dry density as determined by ASTM D1557. 2. A layer of Tensar TX 160 geogrid should be placed over the compacted structural fill followed by 6 inches of compacted structural fill.[2] This process should be continued until two layers of geogrid are in place. At least 6 inches of compacted structural fill should be placed over the top layer of geogrid. Geogrid should extend a minimum of 2 feet beyond the footings on all sides. Geogrid should be overlapped a minimum distance of 24 inches between splices. See the attached Figure 3 for graphical representation of this system.	95% for Native Soils and Structural Fill	4,000 lbs/ft^2

[1]It will be required for Atlas personnel to verify the bearing soil suitability for each structure at the time of construction. [2]Depending on the time of year construction takes place, the subgrade soils may be unstable because of high moisture contents. If unstable conditions are encountered, over-excavation and replacement with granular structural fill and/or use of geotextiles may be required.

A sliding frictional coefficient value of 0.45 should be used for footings bearing on granular structural fill. A passive lateral earth pressure of 356 pounds per square foot per foot (psf/ft) should be used for sandy silt with gravel or silt with sand soils. For compacted sandy gravel fill, a passive lateral earth pressure of 496 psf/ft should be used.

Footings should be proportioned to meet either the stated soil bearing capacity or the 2018 IBC minimum requirements. Total settlement should be limited to approximately 1 inch, and differential settlement should be limited to approximately ½ inch. Objectionable soil types encountered at the bottom of footing excavations should be removed and replaced with structural fill. Excessively loose or soft areas that are encountered in the footings subgrade will require over-excavation and backfilling with structural fill. To minimize the effects of slight differential movement that may occur because of variations in the character of supporting soils and seasonal moisture content, Atlas recommends continuous footings be suitably reinforced to make them as rigid as possible. For frost protection, the bottom of external footings should be 30 inches below finished grade. Based on the soil types encountered onsite, foundation drains are not needed.

6.2 Floor Slab-on-Grade

Fill material was encountered in the borings advanced on the site. Atlas recommends that these fill materials be removed to expose native soils or compacted in place to at least 95 percent of the maximum dry density as determined by ASTM D1557. Once final grades have been determined, Atlas is available to provide additional recommendations.

Organic, loose, or obviously compressive materials must be removed prior to placement of concrete floors or floor-supporting fill. In addition, the remaining subgrade should be treated in accordance with guidelines presented in the **Earthwork** section. Areas of excessive yielding should be excavated and backfilled with structural fill. Fill used to increase the elevation of the floor slab should meet requirements detailed in the **Structural Fill** section. Fill materials must be compacted to a minimum 95 percent of the maximum dry density as determined by ASTM D1557.

A free-draining granular mat should be provided below slabs-on-grade to provide drainage and a uniform and stable bearing surface. This should be a minimum of 4 inches in thickness and properly compacted. The mat should consist of a sand and gravel mixture, complying with Idaho Standards for Public Works Construction (ISPWC) specifications for ¾-inch (Type 1) crushed aggregate. The granular mat should be compacted to no less than 95 percent of the maximum dry density as determined by ASTM D1557. A moisture-retarder should be placed beneath floor slabs to minimize potential ground moisture effects on moisture-sensitive floor coverings. The moisture-retarder should be at least 15-mil in thickness and have a permeance of less than 0.01 US perms as determined by ASTM E96. Placement of the moisture-retarder will require special consideration with regard to effects on the slab-on-grade and should adhere to recommendations outlined in the ACI 302.1R and ASTM E1745 publications. Upon request, Atlas can provide further consultation regarding installation.

7. PAVEMENT DISCUSSION AND RECOMMENDATIONS

Atlas has made assumptions for traffic loading variables based on the character of the proposed construction. The Client shall review and understand these assumptions to make sure they reflect intended use and loading of pavements both now and in the future. Based on experience with soils in the region, a subgrade California Bearing Ratio (CBR) value of 4 has been assumed for near-surface silt soils on site. The following are minimum thickness requirements for assured pavement function. Depending on site conditions, additional work, e.g. soil preparation, may be required to support construction equipment. These have been listed within the **Soft Subgrade Soils** section.

7.1 Flexible Pavement Sections

The American Association of State Highway and Transportation Officials (AASHTO) design method has been used to calculate the following pavement sections. Calculation sheets provided in the **Appendix** indicate the soils constant, traffic loading, traffic projections, and material constants used to calculate the pavement sections. Atlas recommends that materials used in the construction of asphaltic concrete pavements meet requirements of the ISPWC Standard Specification for Highway Construction. Construction of the pavement section should be in accordance with these specifications and should adhere to guidelines recommended in the section on **Construction Considerations**.

Table 4 – AASHTO Flexible Pavement Specifications

Pavement Section Component	Driveways and Parking Light Duty	Driveways and Parking Heavy Duty
Asphaltic Concrete	2.5 Inches	3.0 Inches
Crushed Aggregate Base	4.0 Inches	4.0 Inches
Structural Subbase	8.0 Inches	12.0 Inches
Compacted Subgrade	See **Pavement Subgrade Preparation** Section	See **Pavement Subgrade Preparation** Section

[1]**It will be required for Atlas personnel to verify subgrade competency at the time of construction.**

- Asphaltic Concrete: Asphalt mix design shall meet the requirements of ISPWC, Section 810. Materials shall be placed in accordance with ISPWC Standard Specifications for Highway Construction.
- Aggregate Base: Material complying with ISPWC Standards for Crushed Aggregate Materials.
- Structural Subbase: Granular structural fill material complying with the requirements detailed in the **Structural Fill** section of this report except that the maximum material diameter is no more than $^{2}/_{3}$ the component thickness. Gradation and suitability requirements shall be per ISPWC Section 801, Table 1.

7.2 Pavement Subgrade Preparation

Uncontrolled fill was encountered in portions of the site. Atlas recommends that these fill materials be removed to a depth of at least 1½ feet below existing grade. If fill materials remain after excavation, the exposed subgrade must be compacted to at least 95 percent of the maximum dry density as determined by ASTM D698.The excavated fill materials can be replaced in accordance with the **Structural Fill** section provided that all organic material and/or debris is completely removed. Once final grades have been determined, Atlas is available to provide additional recommendations.

7.3 Common Pavement Section Construction Issues

The subgrade upon which above pavement sections are to be constructed must be properly stripped, inspected, and proof-rolled. Proof rolling of subgrade soils should be accomplished using a heavy rubber-tired, fully loaded, tandem-axle dump truck or equivalent. Verification of subgrade competence by Atlas personnel at the time of construction is required. Fill materials on the site must demonstrate the indicated compaction prior to placing material in support of the pavement section. Atlas anticipated that pavement areas will be subjected to moderate traffic. Subgrade silty soils near and above optimum moisture contents may pump during compaction. Pumping or soft areas must be removed and replaced with structural fill.

Fill material and aggregates in support of the pavement section must be compacted to no less than 95 percent of the maximum dry density as determined by ASTM D698 for flexible pavements and by ASTM D1557 for rigid pavements. If a material placed as a pavement section component cannot be tested by usual compaction testing methods, then compaction of that material must be approved by observed proof rolling. Minor deflections from proof rolling for flexible pavements are allowable. Deflections from proof rolling of rigid pavement support courses should not be visually detectable.

Atlas recommends that rigid concrete pavement be provided for heavy garbage receptacles. This will eliminate damage caused by the considerable loading transferred through the small steel wheels onto asphaltic concrete. Rigid concrete pavement should consist of Portland Cement Concrete Pavement (PCCP) generally adhering to ITD specifications for Urban Concrete. PCCP should be 6 inches thick on a 4-inch drainage fill course (see **Floor Slab-on-Grade** section) and should be reinforced with welded wire fabric. Control joints must be on 12-foot centers or less.

8. CONSTRUCTION CONSIDERATIONS

Recommendations in this report are based upon structural elements of the project being founded on competent, native silt with sand soils or compacted structural fill. Structural areas should be stripped to an elevation that exposes these soil types.

8.1 Earthwork

Excessively organic soils, deleterious materials, or disturbed soils generally undergo high volume changes when subjected to loads, which is detrimental to subgrade behavior in the area of pavements, floor slabs, structural fills, and foundations. Stripping depths should be adjusted in the field to assure that the entire root zone or disturbed zone or topsoil are removed prior to placement and compaction of structural fill materials. Exact removal depths should be determined during grading operations by Atlas personnel, and should be based upon subgrade soil type, composition, and firmness or soil stability. If underground storage tanks, underground utilities, wells, or septic systems are discovered during construction activities, they must be decommissioned then removed or abandoned in accordance with governing Federal, State, and local agencies. Excavations developed as the result of such removal must be backfilled with structural fill materials as defined in the **Structural Fill** section.

Atlas should oversee subgrade conditions (i.e., moisture content) as well as placement and compaction of new fill (if required) after native soils are excavated to design grade. Recommendations for structural fill presented in this report can be used to minimize volume changes and differential settlements that are detrimental to the behavior of footings, pavements, and floor slabs. Sufficient density tests should be performed to properly monitor compaction. For structural fill beneath building structures, one in-place density test per lift for every 5,000 square feet is recommended. In parking and driveway areas, this can be decreased to one test per lift for every 10,000 square feet.

8.2 Dry Weather

If construction is to be conducted during dry seasonal conditions, many problems associated with soft soils may be avoided. However, some rutting of subgrade soils may be induced by shallow groundwater conditions related to springtime runoff or irrigation activities during late summer through early fall. Solutions to problems associated with soft subgrade soils are outlined in the **Soft Subgrade Soils** section. Problems may also arise because of lack of moisture in native and fill soils at time of placement. This will require the addition of water to achieve near-optimum moisture levels. Low-cohesion soils exposed in excavations may become friable, increasing chances of sloughing or caving. Measures to control excessive dust should be considered as part of the overall health and safety management plan.

8.3 Wet Weather

If construction is to be conducted during wet seasonal conditions (commonly from mid-November through May), problems associated with soft soils must be considered as part of the construction plan. During this time of year, fine-grained soils such as silts and clays will become unstable with increased moisture content, and eventually deform or rut. Additionally, constant low temperatures reduce the possibility of drying soils to near optimum conditions.

8.4 Soft Subgrade Soils

Shallow fine-grained subgrade soils that are high in moisture content should be expected to pump and rut under construction traffic. Throughout construction, soft areas may develop after the existing asphalt is removed and heavy rubber tired equipment drives over the site. In addition, areas where significant cracking has occurred will likely have soft subgrade soils because of moisture infiltration and will be prone to pumping and rutting.

During periods of wet weather, construction may become very difficult if not impossible. The following recommendations and options have been included for dealing with soft subgrade conditions:

- Track-mounted vehicles should be used to remove the existing asphalt and to perform any other necessary excavations. Heavy rubber-tired equipment should be prohibited from operating directly on the native subgrade and areas in which structural fill materials have been placed. Construction traffic should be restricted to designated roadways that do not cross, or cross on a limited basis, proposed roadway or parking areas.
- Soft areas can be over-excavated and replaced with granular structural fill.
- Construction roadways on soft subgrade soils should consist of a minimum 2-foot thickness of large cobbles of 4 to 6 inches in diameter with sufficient sand and fines to fill voids. Construction entrances should consist of a 6-inch thickness of clean, 2-inch minimum, angular drain-rock and must be a minimum of 10 feet wide and 30 to 50 feet long. During the construction process, top dressing of the entrance may be required for maintenance.
- Scarification and aeration of subgrade soils can be employed to reduce the moisture content of wet subgrade soils. After stripping is complete, the exposed subgrade should be ripped or disked to a depth of 1½ feet and allowed to air dry for 2 to 4 weeks. Further disking should be performed on a weekly basis to aid the aeration process.
- Alternative soil stabilization methods include use of geotextiles, lime, and cement stabilization. Atlas is available to provide recommendations and guidelines at your request.

8.5 Frozen Subgrade Soils

Prior to placement of structural fill materials or foundation elements, frozen subgrade soils must either be allowed to thaw or be stripped to depths that expose non-frozen soils and wasted or stockpiled for later use. Stockpiled materials must be allowed to thaw and return to near-optimal conditions prior to use as structural fill.

The onsite, shallow silty soils are susceptible to frost heave during freezing temperatures. For exterior flatwork and other structural elements, adequate drainage away from subgrades is critical. Compaction and use of structural fill will also help to mitigate the potential for frost heave. Complete removal of frost susceptible soils for the full frost depth, followed by replacement with a non-frost susceptible structural fill, can also be used to mitigate the potential for frost heave. Atlas is available to provide further guidance/assistance upon request.

8.6 Structural Fill

Soils recommended for use as structural fill are those classified as GW, GP, SW, and SP in accordance with the Unified Soil Classification System (USCS) (ASTM D2487). Use of silty soils (USCS designation of GM, SM, and ML) as structural fill may be acceptable. However, use of silty soils (GM, SM, and ML) as structural fill below footings is prohibited. These materials require very high moisture contents for compaction and require a long time to dry out if natural moisture contents are too high and may also be susceptible to frost heave under certain conditions. Therefore, these materials can be quite difficult to work with as moisture content, lift thickness, and compactive effort becomes difficult to control. If silty soil is used for structural fill, lift thicknesses should not exceed 6 inches (loose), and fill material moisture must be closely monitored at both the working elevation and the elevations of materials already placed. Following placement, silty soils must be protected from degradation resulting from construction traffic or subsequent construction.

Recommended granular structural fill materials, those classified as GW, GP, SW, and SP, should consist of a 6-inch minus select, clean, granular soil with no more than 50 percent oversize (greater than ¾-inch) material and no more than 12 percent fines (passing No. 200 sieve). These fill materials should be placed in layers not to exceed 12 inches in loose thickness. Prior to placement of structural fill materials, surfaces must be prepared as outlined in the **Construction Considerations** section. Structural fill material should be moisture-conditioned to achieve optimum moisture content prior to compaction. For structural fill below footings, areas of compacted backfill must extend outside the perimeter of the footings for a distance equal to the thickness of fill between the bottom of foundation and underlying soils, or 5 feet, whichever is less. All fill materials must be monitored during placement and tested to confirm compaction requirements, outlined below, have been achieved.

Each layer of structural fill must be compacted, as outlined below:

- Below Structures and Rigid Pavements: A minimum of 95 percent of the maximum dry density as determined by ASTM D1557.
- Below Flexible Pavements: A minimum of 92 percent of the maximum dry density as determined by ASTM D1557 or 95 percent of the maximum dry density as determined by ASTM D698.

The ASTM D1557 test method must be used for samples containing up to 40 percent oversize (greater than ¾-inch) particles. If material contains more than 40 percent but less than 50 percent oversize particles, compaction of fill must be confirmed by proof rolling each lift with a 10-ton vibratory roller (or equivalent) until the maximum density has been achieved. Density testing must be performed after each proof rolling pass until the in-place density test results indicate a drop (or no increase) in the dry density, defined as maximum density or "break over" point. The number of required passes should be used as the requirements on the remainder of fill placement. Material should contain sufficient fines to fill void spaces, and must not contain more than 50 percent oversize particles.

8.7 Backfill of Walls

Backfill materials must conform to the requirements of structural fill, as defined in this report. For wall heights greater than 2.5 feet, the maximum material size should not exceed 4 inches in diameter. Placing oversized material against rigid surfaces interferes with proper compaction, and can induce excessive point loads on walls. Backfill shall not commence until the wall has gained sufficient strength to resist placement and compaction forces. Further, retaining walls above 2.5 feet in height shall be backfilled in a manner that will limit the potential for damage from compaction methods and/or equipment. It is recommended that only small hand-operated compaction equipment be used for compaction of backfill within a horizontal distance equal to the height of the wall, measured from the back face of the wall.

Backfill should be compacted in accordance with the specifications for structural fill, except in those areas where it is determined that future settlement is not a concern, such as planter areas. In nonstructural areas, backfill must be compacted to a firm and unyielding condition.

8.8 Excavations

Shallow excavations that do not exceed 4 feet in depth may be constructed with side slopes approaching vertical. Below this depth, it is recommended that slopes be constructed in accordance with Occupational Safety and Health Administration (OSHA) regulations, Section 1926, Subpart P. Based on these regulations, on-site soils are classified as type "C" soil, and as such, excavations within these soils should be constructed at a maximum slope of 1½ feet horizontal to 1 foot vertical (1½:1) for excavations up to 20 feet in height. Excavations in excess of 20 feet will require additional analysis. Note that these slope angles are considered stable for short-term conditions only, and will not be stable for long-term conditions.

During the subsurface exploration, boring sidewalls generally exhibited little indication of collapse. For deep excavations, native granular sediments cannot be expected to remain in position. These materials are prone to failure and may collapse, thereby undermining upper soil layers. This is especially true when excavations approach depths near the water table. Care must be taken to ensure that excavations are properly backfilled in accordance with procedures outlined in this report.

8.9 Groundwater Control

Groundwater was not encountered during the investigation and is anticipated to be below the depth of most construction. Should the scope of the proposed project change, Atlas should be contacted to provide more detailed groundwater control measures.

Special precautions may be required for control of surface runoff and subsurface seepage. It is recommended that runoff be directed away from open excavations. Silty soils may become soft and pump if subjected to excessive traffic during time of surface runoff. Ponded water in construction areas should be drained through methods such as trenching, sloping, crowning grades, nightly smooth drum rolling, or installing a French drain system. Additionally, temporary or permanent driveway sections should be constructed if extended wet weather is forecasted.

9. GENERAL COMMENTS

Based on the subsurface conditions encountered during this investigation and available information regarding the proposed structure, the site is adequate for the planned construction. When plans and specifications are complete, and if significant changes are made in the character or location of the proposed structure, consultation with Atlas must be arranged as supplementary recommendations may be required. Suitability of subgrade soils and compaction of structural fill materials must be verified by Atlas personnel prior to placement of structural elements. Additionally, monitoring and testing should be performed to verify that suitable materials are used for structural fill and that proper placement and compaction techniques are utilized.

10. REFERENCES

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Appendix I WARRANTY AND LIMITING CONDITIONS

Atlas warrants that findings and conclusions contained herein have been formulated in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology only for the site and project described in this report. These engineering methods have been developed to provide the client with information regarding apparent or potential engineering conditions relating to the site within the scope cited above and are necessarily limited to conditions observed at the time of the site visit and research. Field observations and research reported herein are considered sufficient in detail and scope to form a reasonable basis for the purposes cited above.

Exclusive Use

This report was prepared for exclusive use of the property owner(s), at the time of the report, and their retained design consultants ("Client"). Conclusions and recommendations presented in this report are based on the agreed-upon scope of work outlined in this report together with the Contract for Professional Services between the Client and Atlas Technical Consultants ("Consultant"). Use or misuse of this report, or reliance upon findings hereof, by parties other than the Client is at their own risk. Neither Client nor Consultant make representation of warranty to such other parties as to accuracy or completeness of this report or suitability of its use by such other parties for purposes whatsoever, known or unknown, to Client or Consultant. Neither Client nor Consultant shall have liability to indemnify or hold harmless third parties for losses incurred by actual or purported use or misuse of this report. No other warranties are implied or expressed.

Report Recommendations are Limited and Subject to Misinterpretation

There is a distinct possibility that conditions may exist that could not be identified within the scope of the investigation or that were not apparent during our site investigation. Findings of this report are limited to data collected from noted explorations advanced and do not account for unidentified fill zones, unsuitable soil types or conditions, and variability in soil moisture and groundwater conditions. To avoid possible misinterpretations of findings, conclusions, and implications of this report, Atlas should be retained to explain the report contents to other design professionals as well as construction professionals.

Since actual subsurface conditions on the site can only be verified by earthwork, note that construction recommendations are based on general assumptions from selective observations and selective field exploratory sampling. Upon commencement of construction, such conditions may be identified that require corrective actions, and these required corrective actions may impact the project budget. Therefore, construction recommendations in this report should be considered preliminary, and Atlas should be retained to observe actual subsurface conditions during earthwork construction activities to provide additional construction recommendations as needed.

Since geotechnical reports are subject to misinterpretation, **do not** separate the soil logs from the report. Rather, provide a copy of, or authorize for their use, the complete report to other design professionals or contractors. Locations of exploratory sites referenced within this report should be considered approximate locations only. For more accurate locations, services of a professional land surveyor are recommended.

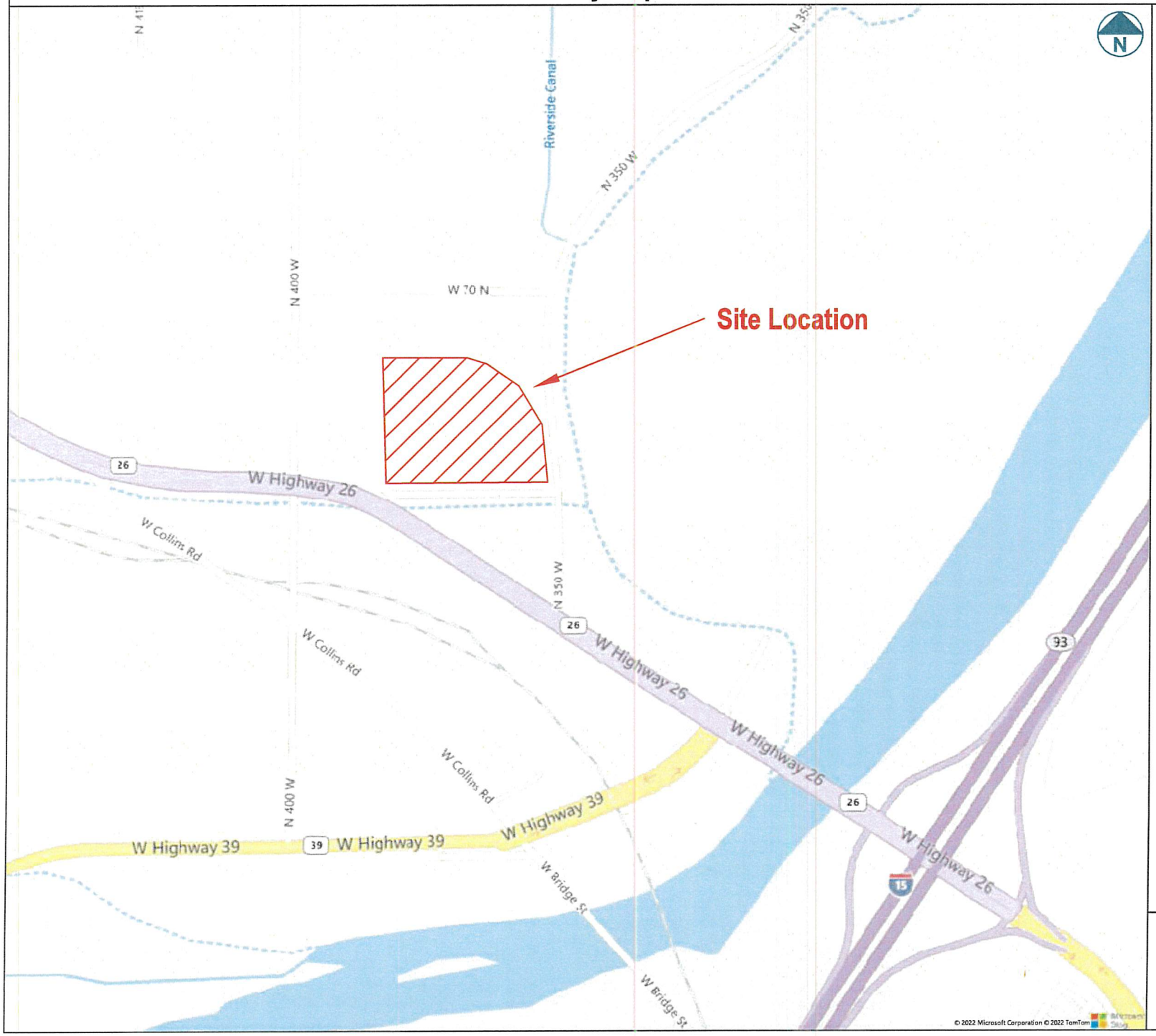
This report is also limited to information available at the time it was prepared. In the event additional information is provided to Atlas following publication of our report, it will be forwarded to the client for evaluation in the form received.

Environmental Concerns

Comments in this report concerning either onsite conditions or observations, including soil appearances and odors, are provided as general information. These comments are not intended to describe, quantify, or evaluate environmental concerns or situations. Since personnel, skills, procedures, standards, and equipment differ, a geotechnical investigation report is not intended to substitute for a geoenvironmental investigation or a Phase II/III Environmental Site Assessment. If environmental services are needed, Atlas can provide, via a separate contract, those personnel who are trained to investigate and delineate soil and water contamination.

Vicinity Map

Figure 1



MAP NOTES:

- Not to Scale

LEGEND

Approximate Site Location

Blackfoot Maintenance Building
46 North 350 West
Blackfoot, ID

Modified by: KEW
November 16, 2022
Drawing: P222393g

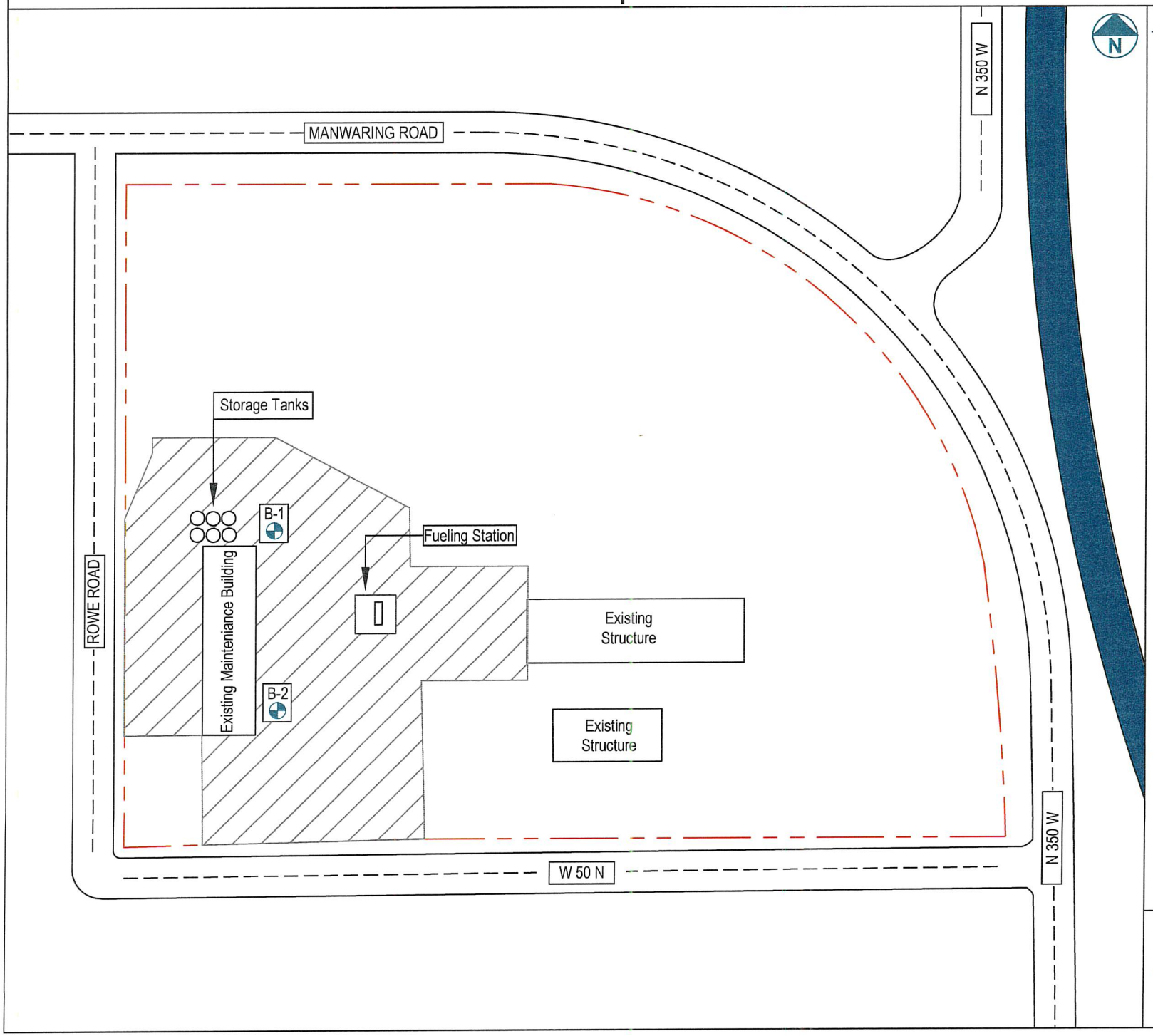
ATLAS

149 McKinley Avenue
Pocatello, ID 83201

Phone: (208) 233-9500
Fax: (208) 233-9900
Web: oneatlas.com

Site Map

Figure 2



NOTES:

- Not to Scale

LEGEND

- Approximate Site Boundary
- Existing Paved Areas
- Approximate Atlas Boring Location
- Existing Irrigation Canal

Blackfoot Maintenance Building
46 North 350 West
Blackfoot, ID

Drawn by: KEW
November 16, 2022
Drawing: P222393g

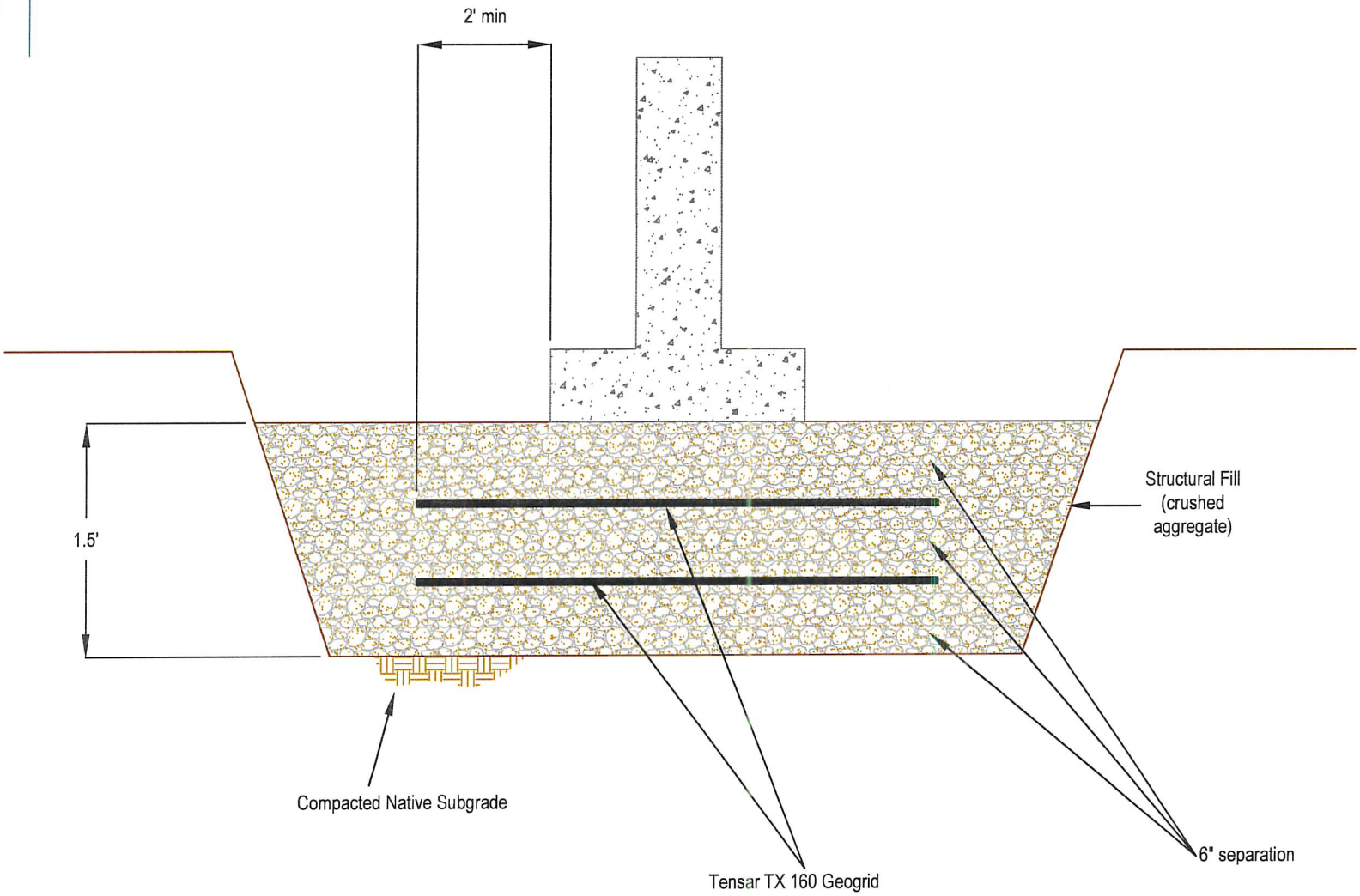
ATLAS
149 McKinley Avenue
Pocatello, ID 83201
Phone: (208) 233-9500
Fax: (208) 233-9900
Web: oneatlas.com

Foundation Cross Section

Figure 3

NOTES:

- Structural fill must consist of ISPWC 3/4" Type 1 crushed aggregate.
- Native subgrade soils and fill material must be compacted to at least 95% of the maximum dry density as determined by ASTM D1557.
- Geogrid to be installed in accordance with manufacturers recommendations.



NOTES:

- Not to Scale

Blackfoot Maintenance Building
46 North 350 West
Blackfoot, ID

Modified by: EJS
January 16, 2023
Drawing: P222393g

ATLAS

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Pocatello, ID 83201

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FIELD BORING LOG

BORING NO.: B-1
TOTAL DEPTH: 16.5'
GROUNDWATER DEPTH: None

PROJECT INFORMATION

PROJECT:	Blackfoot Maintenance Building
LOCATION:	46 North 350 West Blackfoot, ID
JOB NO.:	P222393g
LOGGED BY:	Keaton Ward

DRILLING INFORMATION

DRILLING CO.:	Haztech Drilling, Inc.
METHOD OF DRILLING:	6" Hollow Stem Auger
SAMPLING METHODS:	Split Spoon
DATES DRILLED:	October 27, 2022
LATITUDE/LONGITUDE:	43.204688, -112.373589

▼ Water level during drilling | Standard Split Spoon | Auger Sample | California Sampler

DEPTH	SOIL TYPE	DESCRIPTION	MOISTURE (%)	LL/PI	% < #4	% < #200	SAMPLE	BLOWS	BLOWS PER FOOT (N)
0		ASPHALTIC CONCRETE: --3 inches thick.						6,4,4	
		AGGREGATE BASE (GP-FILL): --Brown, dry, loose, with fine to coarse-grained sand and fine to coarse gravels.						1,2,2	
5		SILT WITH SAND (ML): Brown, dry to slightly moist, soft to medium stiff, with fine to coarse-grained sand and trace fine gravel.						2,5,6	0 30 60
		POORLY GRADED SAND WITH GRAVEL (SP): Brown, dry, medium dense to very dense, with fine to coarse-grained sand and fine gravels.						2,11,14	
10								4,14,15	0 30 60
15								8,38,47	0 30 60

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FIELD BORING LOG

BORING NO.: B-2
TOTAL DEPTH: 16.5'
GROUNDWATER DEPTH: None

PROJECT INFORMATION

PROJECT:	Blackfoot Maintenance Building
LOCATION:	46 North 350 West Blackfoot, ID
JOB NO.:	P222393g
LOGGED BY:	Keaton Ward

DRILLING INFORMATION

DRILLING CO.:	Haztech Drilling, Inc.
METHOD OF DRILLING:	6" Hollow Stem Auger
SAMPLING METHODS:	Split Spoon
DATES DRILLED:	October 27, 2022
LATITUDE/LONGITUDE:	43.204242, -112.373580

Water level during drilling | Standard Split Spoon | Auger Sample | California Sampler

DEPTH	SOIL TYPE	DESCRIPTION	MOISTURE (%)	LL/PI	% < #4	% < #200	SAMPLE	BLOWS	BLOWS PER FOOT (N)
0		ASPHALTIC CONCRETE: 3 inches thick.						13,11,6	
		AGGREGATE BASE (GP-FILL): --Brown, dry, loose, with fine to coarse-grained sand and fine to coarse gravels.							
		SILT WITH SAND (ML): Brown, dry to slightly moist, soft to medium stiff, with fine to coarse-grained sand and trace fine gravel.	18.7	N/P	100	74.4		1,2,2	
5		POORLY GRADED SAND WITH GRAVEL (SP): Brown, dry, loose to dense, with fine to coarse-grained sand and fine gravels.						5,4,3	
								8,19,31	
10								12,35,15	
15								9,14,13	

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Appendix VI GEOTECHNICAL GENERAL NOTES

Unified Soil Classification System			
Major Divisions		**Symbol**	**Soil Descriptions**
Coarse-Grained Soils < 50% passes No.200 sieve	Gravel & Gravelly Soils < 50% coarse	GW	Well-graded gravels; gravel/sand mixtures with little or no fines
		GP	Poorly-graded gravels; gravel/sand mixtures with little or no fines
		GM	Silty gravels; poorly-graded gravel/sand/silt mixtures
		GC	Clayey gravels; poorly-graded gravel/sand/clay mixtures
	Sand & Sandy Soils > 50% coarse fraction	SW	Well-graded sands; gravelly sands with little or no fines
		SP	Poorly-graded sands; gravelly sands with little or no fines
		SM	Silty sands; poorly-graded sand/gravel/silt mixtures
		SC	Clayey sands; poorly-graded sand/gravel/clay mixtures
Fine-Grained Soils > 50% passes No.200 sieve	Silts & Clays LL < 50	ML	Inorganic silts; sandy, gravelly or clayey silts
		CL	Lean clays; inorganic, gravelly, sandy, or silty, low to medium-plasticity clays
		OL	Organic, low-plasticity clays and silts
	Silts & Clays LL > 50	MH	Inorganic, elastic silts; sandy, gravelly or clayey elastic silts
		CH	Fat clays; high-plasticity, inorganic clays
		OH	Organic, medium to high-plasticity clays and silts
Highly Organic Soils		PT	Peat, humus, hydric soils with high organic content

Relative Density and Consistency Classification	
Coarse-Grained Soils	**SPT Blow Counts (N)**
Very Loose:	< 4
Loose:	4-10
Medium Dense:	10-30
Dense:	30-50
Very Dense:	> 50
Fine-Grained Soils	**SPT Blow Counts (N)**
Very Soft:	< 2
Soft:	2-4
Medium Stiff:	4-8
Stiff:	8-15
Very Stiff:	15-30
Hard:	> 30

Moisture Content and Cementation Classification	
Description	**Field Test**
Dry	Absence of moisture, dry to touch
Slightly Moist	Damp, but no visible moisture
Moist	Visible moisture
Wet	Visible free water
Saturated	Soil is usually below water table
Description	**Field Test**
Weak	Crumbles or breaks with handling or slight finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

Particle Size	
Boulders:	> 12 in.
Cobbles:	12 to 3 in.
Gravel:	3 in. to 5 mm
Coarse-Grained Sand:	5 to 0.6 mm
Medium-Grained Sand:	0.6 to 0.2 mm
Fine-Grained Sand:	0.2 to 0.075 mm
Silts:	0.075 to 0.005 mm
Clays:	< 0.005 mm

Acronym List	
GS	grab sample
LL	Liquid Limit
M	moisture content
NP	non-plastic
PI	Plasticity Index
Q_p	penetrometer value, unconfined compressive strength, tsf
V	vane value, ultimate shearing strength, tsf

Appendix VII AASHTO PAVEMENT DESIGN

Pavement Section Design Location: Blackfoot Maintenance Building Expansion - Light Duty

Average Daily Traffic Count:	50	All Lanes & Both Directions		
Design Life:	20	Years		
Percent of Traffic in Design Lane:	50%			
Terminal Seviceability Index (Pt):	2.5			
Level of Reliability:	95			
Subgrade CBR Value:	4		**Subgrade Mr:**	6,000

Calculation of Design-18 kip ESALs

	Daily Traffic	Growth Rate	Load Factors	Design ESALs
Passenger Cars:	13	2.0%	0.0008	92
Buses:	0	2.0%	0.6806	0
Panel & Pickup Trucks:	9	2.0%	0.0122	974
2-Axle, 6-Tire Trucks:	2	2.0%	0.1890	3,352
Emergency Vehicles:	1.0	2.0%	4.4800	39,731
Dump Trucks:	0	2.0%	3.6300	0
Tractor Semi Trailer Trucks:	0	2.0%	2.3719	0
Double Trailer Trucks	0	2.0%	2.3187	0
Heavy Tractor Trailer Combo Trucks:	0	2.0%	2.9760	0
Average Daily Traffic in Design Lane:	25			

Total Design Life 18-kip ESALs:	44,149
Actual Log (ESALs):	4.645
Trial SN:	2.41
Trial Log (ESALs):	4.653
Pavement Section Design SN:	2.41

	Design Depth Inches	Structural Coefficient	Drainage Coefficient
Asphaltic Concrete:	2.50	0.42	n/a
Asphalt-Treated Base:	0.00	0.25	n/a
Cement-Treated Base:	0.00	0.17	n/a
Crushed Aggregate Base:	4.00	0.14	1.0
Subbase:	8.00	0.10	1.0
Special Aggregate Subgrade:	0.00	0.09	0.9

AASHTO PAVEMENT DESIGN

Pavement Section Design Location: Blackfoot Maintenance Building Expansion - Heavy Duty

Average Daily Traffic Count:	50	All Lanes & Both Directions		
Design Life:	20	Years		
Percent of Traffic in Design Lane:	50%			
Terminal Seviceability Index (Pt):	2.5			
Level of Reliability:	95			
Subgrade CBR Value:	4		**Subgrade Mr:**	6,000

Calculation of Design-18 kip ESALs

	Daily Traffic	Growth Rate	Load Factors	Design ESALs
Passenger Cars:	3	2.0%	0.0008	21
Buses:	0	2.0%	0.6806	0
Panel & Pickup Trucks:	12	2.0%	0.0122	1,298
2-Axle, 6-Tire Trucks:	6	2.0%	0.1890	10,057
Emergency Vehicles:	1.0	2.0%	4.4800	39,731
Dump Trucks:	3	2.0%	3.6300	96,578
Tractor Semi Trailer Trucks:	0	2.0%	2.3719	0
Double Trailer Trucks	0	2.0%	2.3187	0
Heavy Tractor Trailer Combo Trucks:	0	2.0%	2.9760	0
Average Daily Traffic in Design Lane:	25			

Total Design Life 18-kip ESALs:	147,686
Actual Log (ESALs):	5.169
Trial SN:	2.94
Trial Log (ESALs):	5.173
Pavement Section Design SN:	3.02

	Design Depth Inches	Structural Coefficient	Drainage Coefficient
Asphaltic Concrete:	3.00	0.42	n/a
Asphalt-Treated Base:	0.00	0.25	n/a
Cement-Treated Base:	0.00	0.17	n/a
Crushed Aggregate Base:	4.00	0.14	1.0
Subbase:	12.00	0.10	1.0
Special Aggregate Subgrade:	0.00	0.09	0.9

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

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