AGENDA
OF THE WORK SESSION
CITY OF EAST GRAND FORKS
TUESDAY, MARCH 10, 2026 – 5:00 PM

PUBLIC NOTICE – interactive Technology Participation
In accordance with Minnesota Statute 13D.02, Subdivision 4, Council Members may Participate in this meeting via interactive technology when necessary.

CALL TO ORDER:

CALL OF ROLL:

DETERMINATION OF A QUORUM:

AGENDA:

1. Fire Station No. 2 Update / Fire Station No. 2 Tour Invitation - Fire Chief Jeff Boushee
2. Senior Citizens Center Board of Commissioners By-Law Update - Jeremy King, Parks & Recreation
3. File Plans & Specifications – 2026 City Project No. 1 – Point Bridge Rehabilitation - Steve Emery, PE
4. Discussion Regarding the Minnesota Flag – **Reid Huttunen, City Administrator**

ADJOURN:

Upcoming Meetings

Council Meeting – Tuesday, March 17, 2026 – Council Chambers – 5:00 PM
Work Session – Tuesday, March 24, 2026 – Training Room – 5:00 PM
Council Meeting – Tuesday, March 3, 2026 – Council Chambers – 5:00 PM
Work Session – Tuesday, April 7, 2026 – Training Room – 5:00 PM

Individuals with disabilities, language barriers or other needs who plan to attend the meeting and will need special accommodations should contact Nancy Ellis, ADA Coordinator at (218)-773-2208. Please contact us at least 48 hours before the meeting to give our staff adequate time to make arrangements. Also, materials can be provided in alternative formats for people with disabilities or with limited English proficiency (LEP) by contacting the ADA Coordinator (218)-773-2208 five (5) days prior to the meeting.

Request for Council Action

Date: March 10, 2026

To: East Grand Forks City Council Mayor Mark Olstad, Council President Brian Larson, Council Vice-President Tim Riopelle, Council Members Tami Schumacher, Ben Pokrzywinski, Dale Helms, Donald Casmey, and Karen Peterson.

Cc: File

From: Jeremy King, Parks & Recreation

RE: Senior Citizens Center Board of Commissioners By-Law Update

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Background:
At the most recent Annual Meeting of the Senior Citizens Center Board of Commissioners, the board reviewed the current bylaws and proposed several amendments. These updates are intended to better align the bylaws with the structure and operations of the Senior Citizens Center. The proposed changes adjust the number of board members and regular members required to establish a quorum for annual and special meetings, and remove the two-term limit for commissioners.

Bylaws changed to read:

Annual/Special Meeting:

A. The Annual meeting of the Center shall be held in the Month of June. Time and Date to be determined by the Board of Commissioners.
B. Special meetings of the Center shall be called by the Board of Commissioners or by ~~25~~ 10 members in good standing.

Quorum:

A. The quorum for the annual meeting shall be ~~15~~ 9 members.

B. The quorum for the special meeting shall be ~~50~~ 9 members of the paid general membership

Term of Office:

After the initially appointed commissioner's tenure has terminated, the newly appointed or reappointed commissioner's term of office shall be three (3) years. Any commissioner appointed may serve for ~~a second~~ consecutive terms. ~~Further tenure after serving two successive terms must be followed with one year off the board in order to become eligible for reappointment to the board.~~

Any changes to the bylaws must be approved by the City Council prior to taking effect.

Budget Impact:
None

Recommendation:
Approve updated bylaws

Enclosure:
Updated Bylaws

BY-LAWS

EGF SENIOR CITIZEN CENTER

Board of Commissioners

ARTICLE I

NAME

1. The name of the Organization shall be East Grand Forks Senior Citizen Center's Board of Commissioners; Here in after referred to as the "board".

2. The board is an entity established by ordinance of the East Grand Forks City Council on December 18, 1986.

ARTICLE II

PURPOSE

Because East Grand Forks Senior Citizen's Center, (located at 538 Rhinehart Dr. SE, East Grand Forks, MN) was established for the recreational, social, nutritional and educational welfare of the Senior Citizens of the community the board shall:

1. Develop board policies under the direction of Parks & Recreation Department for the operation of the Center. Provide staff and facilities for its operation and to provide guidance and counsel to its staff and membership.

2. Develop and maintain community wide interest in the activities and welfare of the Center and Senior Citizens of the Community.

3. Enlist the support of the community leaders as well as the community at large. In providing the financial support that the Center will need to operate effectively.

4. Make studies of the desires and needs of the community that can be met through the Center. To make recommendations to the program coordinator, the Parks and Recreation Department and the City Council, to initiate proper programs to fulfill these desires and needs.

ARTICLE III

MEMBERSHIP

There shall be three classes of membership in this Center.

1. Resident Membership:
   Any resident 55 years of age or older, served by the East Grand Forks postal system or school district 595, interested in Senior Citizen's membership shall be eligible for membership (upon payment of dues) in the Center and shall be eligible to vote and hold office on the board of commissioners if appointed.

2. Non Resident Membership:
   Any person 55 years old or older interested in Senior Citizen's membership shall be eligible for membership (upon payment of dues) in the Center and shall be eligible to vote at the annual meeting but not serve on the board.

3. Associate Membership:
   Any organization or institution interested in Senior Citizens shall be eligible for membership and shall name one person as its official representative. This representative shall have the vote of the organization or institution represented, but is not eligible for board membership.

ARTICLE IV

GENERAL MEMBERSHIP MEETING

1. Annual/Special Meeting:
   A. The Annual meeting of the Center shall be held in the Month of June. Time and Date to be determined by the Board of Commissioners.
   B. Special meetings of the Center shall be called by the Board of Commissioners or by ~~25~~ 10 members in good standing.

2. Notice:
   There must be five (5) days public notice to the membership of such annual or special meetings.

3. Voting:
   Each current paid up member shall have one vote.

4. Quorum:
   A. The quorum for the annual meeting shall be ~~15~~ 9 members.

   B. The quorum for the special meeting shall be ~~50~~ 9 members of the paid general membership

ARTICLE V

BOARD OF COMMISSIONERS

1. Appointment of Commissioners:
   The board shall consist of seven (7) members appointed by the mayor and approved by the council of the City of East Grand Forks. These commissioners shall serve without compensation. One of the commissioners must be a member of the city council. Commissioners shall serve for three (3) years. Commissioners shall hold their offices until their successors are appointed and qualified. Director of Parks and Recreation Department will be an ex-officio member of the board of commissioners.

2. Qualifications of the Board:
   All appointed members of the board must be current paid up resident members of the East Grand Forks Senior Citizen Center. The above qualification does not apply to the City Council member appointment.

3. Term of Office:
   After the initially appointed commissioner's tenure has terminated, the newly appointed or reappointed commissioner's term of office shall be three (3) years. Any commissioner appointed may serve for ~~a second~~ consecutive terms. ~~Further tenure after serving two successive terms must be followed with one year off the board in order to become eligible for reappointment to the board.~~

4. Vacancies:
   Any vacancy occurring on the board shall be filled by the Mayor with the approval of the City Council after consideration of the recommendations presented by the board members. A member appointed to fill a vacancy on the board shall be appointed for the unexpired term of his/her predecessor. Filling a vacancy shall not be considered as a term of office and shall not prohibit additional service on the board for the full number of years.

5. Resignation or Removal:
   a. Board members may be removed from their appointment by the Mayor, without City Council consent, for cause after a hearing.

b. A member who seeks to resign from the Board shall submit a written resignation to the President of the board, the Secretary or the office of the Mayor. When possible, the resignation should allow for a thirty-day notice so a new member can be appointed.
c. If a member misses three (3) consecutive Board meetings without a valid excuse, such attendance record shall be considered cause for removal from the Commission.

6. Appointments:
   At the June meeting a search committee of three commissioners shall be appointed to seek out persons who are interested in serving as commissioners, commencing with the following term. At the September meeting, the search committee shall present its recommendations to the Board of Commissioners, which shall then inform the Mayor in writing of its recommendations.

7. Meetings of the Board of Commissioners:
   The board shall meet on a quarterly basis. Quarterly meetings will be held on the 2nd Tuesday of the months of March, June, September, and December, time to be determined by the board. Other meetings of the Board may be held upon three (3) day notice from the Board President or any three (3) board members.

8. Quorum:
   At all meetings of the board, a majority of the board members shall be necessary and sufficient to constitute a quorum for the transaction of business. A minimum of four (4) concurring votes is necessary to transact business. Ayes and Nays shall be taken and recorded by the secretary.

ARTICLE VI

POWERS AND DUTIES OF THE OFFICERS OF THE BOARD

Officers of the Board:

A. Officers shall be elected at the first regular meeting after the mayor's new appointments to the board are qualified. Officers shall hold their office until their successors are elected.
B. All terms of office shall be for one (1) year.

1. Duties of the President:
   The President shall preside at all meetings of the board. He/She shall see that all orders and resolutions of the board shall be carried out. He/She shall be an ex-officio member on all standing committee members. He/She shall appoint all standing committee

members with approval of the board members. The President shall have voting power on all issues.

2. Duties of the Vice-President:
   The Vice-President shall preside and perform the duties of the President in his/her absence and perform all other duties that may be assigned to the office by the President.

3. Duties of the Secretary:
   The Senior Center Coordinator shall serve as the Secretary and record all votes and the minutes of all proceedings in a book kept for the purpose. The secretary shall provide to the board members by mail or electronic copy the upcoming meeting dates, along with a copy of the Agenda, Financial Report, and previous meetings minutes at least three (3) days in advance of the upcoming board meeting. Performs other such duties as may be prescribed by the president.

4. Duties of the Treasurer:
   The Senior Center Coordinator shall serve as the treasurer and keep records of all money generated from grants, individuals and/or community organizations. The treasurer shall present a written quarterly financial accounting to the board.

ARTICLE VII

DUTIES/POWER OF BOARD OF COMMISSIONERS

1. Powers:
   The board shall have the power to do all lawful acts necessary and expedient to conduct the business of the East Grand Forks Senior Citizen Center.

2. Duties included but not limited to the following:
   A. Selecting and hiring a program coordinator for the Center in accordance with the EGF Civil Service Commission policies, and at the direction of the Supt. of Parks & Recreation.
   B. Provide the program coordinator with the board policies and guidelines for the operation of the Center.
   C. Together with the program coordinator and Parks & Recreation Department, prepare an annual budget by August 15 for the presentation to City Council.
   D. Set fiscal year to coincide with calendar year.
   E. Set annual membership dues for the Center.
   F. Develop job descriptions for all hired or contract personnel, with the approval of the Parks & Recreation Department and the City Council.

G. Provide for annual audit of Senior Center operations.

ARTICLE VIII

AMENDMENTS

1. These by-Laws may be amended by a (2/3) vote of the board voting at any duly constituted regular or special meeting. The secretary shall notify the members of the board of commissioners in writing of any proposed amendments. Such notice to be given at least ten (10) days in advance of the meeting. All amendments are ratified by the City Council.

2. By-laws changes shall be reviewed at the annual meeting of the general membership.
   Adopted January 26, 1987 at a special meeting of the board of commissioners of the East Grand Forks Senior Citizen Center. Ratified by the City Council February 3, 1987 (G. Herger) amendments.
   Adopted and ratified –Article V Section 5 ----change meeting date.
   Adopted April 25, 1988, ratified by the City Council May 3, 1988.
   Article V – Section 6. Dispense with roll call voting, use Roberts Rule of Order.
   Adopted April 25, 1988. Ratified by City Council May 3, 1988 (Ruth Stinar).
   Adopted August, 1989, ratified by City Council August 17, 1989:
   Article IV (A) Annual Meeting date.
   Article V (5) Rescind time board shall meet.
   Article V (5) Establishment of search committee.
   Section 5 has now become Section 6.
   Section 6 now has become Section 7.
   Article VI (A) Officers election (G. Heger).
   Adopted May 20, 2025,

Request for Council Action

Date: 3/05/2026

To: East Grand Forks City Council Mayor Mark Olstad, Council President Brian Larson, Council Vice-President Tim Riopelle, Council Members Tami Schumacher, Ben Pokrzywinski, Dale Helms, Donald Casmey, and Karen Peterson.

Cc: File

From: Steve Emery, PE

RE: File Plans & Specifications – 2026 City Project No. 1 – Point Bridge Rehabilitation

Background:
Plans for the Point Bridge Rehabilitation Project have been approved by our MNDOT District 2 office and submitted to St. Paul for final approval and authorization to advance the project to advertising for bids.

In order to expedite this process we are requesting to file Plans and Specifications for the above project and receive authorization to proceed with advertisement asap upon approval by MNDOT to proceed.

Project Funding:
Federal Funding (80/20) – Construction Costs Only: $1,080,000
MNDOT State Aid Construction Funds: $378,413.00
NDDOT (80/20) – $920,000.00
City of Grand Forks

Recommendation:
Authorize Widseth to proceed with Advertising for bids once approval to proceed has been given by MNDOT
Bid Date will be contingent on approval from MNDOT

Enclosures:
MNDOT Letter

NORTHWEST DISTRICT 218-766-5930
3920 Highway 2 West
Bemidji, Mn 56601

February 26, 2026

Mr. Steve Emery
City of E.G.F. Engineer
1600 Central Ave. NE
East Grand Forks, MN 56721

Subject: SP 119-113-008

Dear Steve,

The plan for the above referenced project has been reviewd and approved for State Aid Standards at the MnDot District 2 State Aid Office in Bemidji.

The Approved original plan is being sent to St. Paul for further processing. You will be notified when authorization and approval is complete to advance this project.

Sincerely,

Brian Ketring
District State Aid Engineer

CC: Kristine Elwood

Project File

Request for Council Action

Date: March 10, 2026

To: East Grand Forks City Council Mayor Mark Olstad, Council President Brian Larson, Council Vice-President Tim Riopelle, Council Members Tami Schumacher, Ben Pokrzywinski, Dale Helms, Donald Casmey, and Karen Peterson.

Cc: File

From: Reid Huttunen, City Administrator

RE: Discussion Regarding the Minnesota Flag

Background:
The Governor of Minnesota and the 2023 Minnesota Legislature created a State Emblems Redesign Commission to redesign the official Minnesota state flag and state seal. The Redesign Commission was charged with bringing recommendations on the redesign to the Legislature no later than January 1, 2024, without a vote of the people of Minnesota. The State Flag has remained largely unchanged since 1893; the current official state flag was created in 1957 with modifications in 1983.

The official state flag is not only a symbol of our state, but also of our history and contains historical information on our farming background, Native American heritage and the co-existence that is part of the rich history of our state.

Minnesota Statutes does not require a municipality to fly the state flag. The decision to fly the state flag is a policy decision of the East Grand Forks City Council.

The public reaction to the Redesign Commission redesigned flag has thus far been overwhelmingly negative with feedback to revert back to the Minnesota State Flag as modified in 1983.

Budget Impact:
Approximately $130

Recommendation:
Approve that the Minnesota State Flag, as modified in 1983 to be flown on City property.

Enclosure:
None.

Request for Council Action

Date: March 5th, 2026

To: East Grand Forks City Council Mayor Mark Olstad, Council President Brian Larson, Council Vice-President Tim Riopelle, Council Members Tami Schumacher, Ben Pokrzywinski, Dale Helms, Donald Casmey, and Karen Peterson.

Cc: File

From: Fire Chief Jeff Boushee

RE: Fire Station No. 2 Update / Fire Station No. 2 Tour Invitation

Background:

Fire Station No. 2 Update:
The design and specifications for Fire Station No. 2, which were approved and awarded to Widseth at the June 10, 2025, City Council meeting, have been completed. The finalized design documents, specifications, and the engineer's cost estimate are included for Council review.

Fire Station No. 2 Tour:
City Council members are invited to tour Fire Station No. 2 on March 17, 2026, following the City Council meeting.

The purpose of this tour is to provide Council members with the opportunity to view existing conditions firsthand, including life safety concerns, accessibility challenges, aging building systems, and operational limitations. Observing these conditions in person will provide valuable context as the Council considers future capital planning, renovation priorities, and investment decisions related to Fire Station No. 2.

Budgetary Impact: N/A

Recommendation: N/A

Enclosures:
- Design Drawings
- Specifications & Contract Documents
- Engineer's Cost Estimate
- 2023 Facility Assessment

SPECIFICATIONS
+
CONTRACT DOCUMENTS



EAST GRAND FORKS
FIRE STATION #2 - REMODEL

EAST GRAND FORKS, MINNESOTA

2025-10872

01-09-2026

WiDSETH

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SECTION 00 0101
PROJECT TITLE PAGE

PROJECT TITLE:	**FIRE STATION NO. 2 - REMODEL** **EAST GRAND FORKS, MINNESOTA**
WSN PROJECT NO.:	**2025-10872**
OWNER:	**CITY OF EAST GRAND FORKS** **600 DEMERS AVENUE** **EAST GRAND FORKS, MN 56721**
ARCHITECT/ENGINEERS	**WIDSETH: GRAND FORKS** **3535 SOUTH 31ST STREET, SUITE 203** **GRAND FORKS, ND 58201** **PHONE: 701-795-1975** **PROJECT MANAGER: BRENT DAMMANN** **EMAIL: BRENT.DAMMANN@WIDSETH.COM**
PRE-BID MEETING:	**PRE-BID TIME ON** **MM-DD-YYYY** **ADDRESS OF PRE-BID** **ROOM FOR PRE-BID**
BID OPENING:	**BID OPENING TIME ON** **MM-DD-YYYY** **BID OPENING LOCATION** **ROOM NAME & NUMBER**

DATE: 01-09-2026

PREPARED BY:
WIDSETH

END OF SECTION

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SECTION 00 0105
CERTIFICATIONS PAGE

CIVIL ENGINEER

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

_____Date: 01-09-2026

Dustin Fanfulik

Reg. No. : 54839

ARCHITECT

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the State of Minnesota.

_____Date: 01-09-2026

Brent A. Dammann

Reg. No. : 44145

STRUCTURAL ENGINEER

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

_____Date: 01-09-2026

Derek A. Navratil

Reg. No. : 45022

END OF SECTION

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DIVISION 00



PROCUREMENT AND CONTRACTING REQUIREMENTS

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SECTION 00 0110
TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

00 0101 - Project Title Page

00 0105 - Certifications Page

00 0110 - Table of Contents

00 1113 - Advertisement for Bids

00 2113 - Instructions to Bidders
AIA Document A701 (Current Edition), Instruction to Bidders

00 2213 - Supplemental Instructions to Bidders

00 3100 - Available Project Information
Asbestos Survey, East Grand Forks Fire Department Station #2, Trio Project #T25-150

00 4100 - Bid Form

00 4114 - Responsible Contractor Certification and Response Form

00 4313 - Bid Security

00 4325 - Substitution Request Form - During Procurement

00 5200 - Agreement Form

00 6113 - Performance and Payment Bond

00 6213 - Certificate of Insurance

00 7200 - General Conditions
AIA Document A201 (Current Edition), General Conditions of the Construction Contract

00 7300 - Supplementary Conditions

00 9110 - Addenda

SPECIFICATIONS

DIVISION 01 -- GENERAL REQUIREMENTS

01 1000 - Summary

01 2000 - Price and Payment Procedures

01 2500 - Substitution Procedures

01 3000 - Administrative Requirements

01 4000 - Quality Requirements

01 5000 - Temporary Facilities and Controls

01 5713 - Temporary Erosion and Sediment Control

01 6000 - Product Requirements

01 7000 - Execution and Closeout Requirements

01 7800 - Closeout Submittals

01 9113 - General Commissioning Requirements

DIVISION 02 -- EXISTING CONDITIONS

02 4100 - Demolition

DIVISION 03 -- CONCRETE

03 3000 - Cast-in-Place Concrete

DIVISION 04 -- MASONRY

04 0100 - Maintenance of Masonry

04 2000 - Unit Masonry

DIVISION 05 -- METALS

05 5000 - Metal Fabrications

DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES

06 1000 - Rough Carpentry

06 4100 - Architectural Wood Casework

DIVISION 07 -- THERMAL AND MOISTURE PROTECTION

07 2100 - Thermal Insulation

07 2600 - Vapor Retarders

07 5300 - Elastomeric Membrane Roofing

07 6200 - Sheet Metal Flashing and Trim

07 8400 - Firestopping

07 9200 - Joint Sealants

DIVISION 08 -- OPENINGS

08 1113 - Hollow Metal Doors and Frames

08 1416 - Flush Wood Doors

08 4313 - Aluminum-Framed Storefronts

08 5113 - Aluminum Windows

08 7100 - Door Hardware

08 8000 - Glazing

08 8300 - Mirrors

DIVISION 09 -- FINISHES

09 2116 - Gypsum Board Assemblies

09 5100 - Acoustical Ceilings

09 6500 - Resilient Flooring

09 6813 - Tile Carpeting

09 9000 - Painting and Coatingtion - Sherwin-Williams

DIVISION 10 -- SPECIALTIES

10 2800 - Toilet, Bath, and Laundry Accessories

DIVISION 11 -- EQUIPMENT

11 3013 - Residential Appliances

DIVISION 12 -- FURNISHINGS

12 2400 - Window Shades

DIVISION 22 -- PLUMBING - REFER TO DRAWINGS FOR SECTIONS

DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) - REFER TO DRAWINGS FOR SECTIONS

DIVISION 26 -- ELECTRICAL

26 0000 - Electrical General Requirements

26 0500 - Common Work Results for Electrical

26 0519 - Low-Voltage Electrical Power Conductors and Cables

26 0526 - Grounding and Bonding for Electrical Systems

26 0529 - Hangers and Supports for Electrical Systems

26 0533 - Raceway and Boxes for Electrical Systems

26 0544 - Sleeves and Sleeve Seales for Electrical Raceways and Cabling

26 0553 - Identification for Electrical Systems

26 0943 - Lighting Controls

26 2416 - Panelboards

26 2726 - Wiring Devices

26 2813 - Fuses

26 2816 - Enclosed Switches and Circuit Breakers

26 3200 - Gas-Engine Driven Generator Sets

26 3600 - Transfer Switches

26 5000 - Light Fixtures

DIVISION 27 -- COMMUNICATIONS

27 1100 - Telecommunications

27 5116 - Paging Systems

DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY

A. 28 4621 - Addressable Fire-Alarm Systems

DIVISION 31 -- EARTHWORK

31 1000 - Site Clearing

31 2200 - Grading

31 2323 - Fill

DIVISION 32 -- EXTERIOR IMPROVEMENTS

32 9219 - Seeding

END OF SECTION

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SECTION 00 1113
ADVERTISEMENT FOR BID

FIRE STATION NO. 2 - REMODEL

Contractor's sealed proposals for the construction of Fire Station No. 2 - Remodel will be received by the Owner in accordance with the plans and specifications prepared by:

ARCHITECT

WiDSETH

3535 South 31st Street, Suite 203

Grand Forks, ND 58201

SITE VISIT INFORMATION

Pre-Bid Meeting: MM-dd-yyyy, at Pre-Bid Time

BID DATE INFORMATION: MM-DD-YYYY

Bid Time: Bid Opening Time

Location: Bid Opening Location, Room Name & Number

Attn: Jeff Boushee, Fire Chief

600 Demers Avenue, East Grand Forks, MN 56721

at which time they will be publicly opened and read aloud for the construction of the above named project. . Envelopes containing bids must be sealed, clearly marked on the lower left-hand corner “Bid Enclosed for Fire Station No. 2 - Remodel” and with the name and address of the bidder and the date and hour of the opening.

PROJECT DESCRIPTION: The project involves the remodel of the existing Fire Station No. 2. Work includes the construction of new bunk rooms. The scope of services necessary include masonry, doors & windows, reroof, mechanical and electrical.

Each bid must be accompanied with a cashier’s check, bid bond, U.S. Government Bonds (at par value) or certified check equal to five percent (5%) of the amount of the proposal. Security is payable to the Owner as a guarantee of prompt execution of the contract in accordance with the proposal and Contract documents, along with furnishing Payment and Performance Bonds of One Hundred percent (100%) of the bid amount acceptable to the Owner.

Bids received after the deadline will be returned unopened. Bids are to be submitted on the Bid Form provided in the project manual. Bids not received on the Bid Form will be cause for rejection.

Complete digital project bidding documents are available at https://widseth.com. Click “Bid Documents” in the top right corner of your screen or go to www.questcdn.com and enter the Quest project No. #questCDN on the website’s Project Search page. Please contact QuestCDN.com at (952) 233-1632 or info@questcdn.com for assistance in free membership registration, downloading and working with this digital project information. You may download the digital plan documents electronically for $30. An optional paper set of project documents is also available from CES Imaging for a nonrefundable price of $30 plus printing costs. If you choose a paper copy you will get all addenda as paper copies and will be charged for the printing costs. Please make your check payable to CES Imaging and send it to 1701 James Circle N, Brooklyn Center, MN 55430. Please contact CES Imaging Repro Dept at (763) 560-9098 or (800) 831-8587 for pricing and if you have any questions.

The successful bidder must be a “responsible contractor.” The term “responsible contractor” means a contractor as defined in Minnesota Statutes Section 16C.285, subdivision 3. Any prime contractor, subcontractor, or motor carrier that does not meet the minimum criteria or fails to comply with the verification requirements is not a responsible contractor and is not eligible to be awarded a construction contract for the project or to perform work on the project. A prime contractor, subcontractor, or motor carrier that makes a false statement under oath verifying compliance with the minimum criteria will be ineligible to be awarded a construction contract on the project and the submission of a false statement may result in termination of a contract awarded to a prime contractor, subcontractor, or motor carrier that submits the false statement. A prime contractor shall include in its verification of compliance a list of all of its first-tier subcontractors that it intends to retain for work on the project. Before execution of a construction contract, a prime contractor shall submit a supplemental verification under oath confirming that all subcontractors and motor carriers that the prime contractor intends to use to perform project work have verified to the prime contractor, through a signed statement under oath by an owner or officer, that they meet the minimum criteria for a responsible contractor.

Bids may not be withdrawn within forty-five (45) days after the scheduled closing time for receiving bids without consent of the Owner. The Owner reserves the right to reject any and all bids and rebid the project until a satisfactory bid is received.

No bid will be read or considered if the bid does not fully comply with the requirements of this invitation and/or other bidding and contract documents. Any deficient bid submitted will be resealed and returned to the bidder immediately.

By: Jeff Boushee, Fire Chief
City of East Grand Forks

END OF SECTION

SECTION 00 2113
INSTRUCTIONS TO BIDDERS

SUMMARY

SEE AIA A701 (CURRENT EDITION), INSTRUCTIONS TO BIDDERS BOUND IN THE PROJECT MANUAL.

END OF SECTION

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AIA® Document A701® – 2018

Instructions to Bidders

for the following Project:
(Name, location, and detailed description)

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

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

TABLE OF ARTICLES

1 DEFINITIONS

2 BIDDER'S REPRESENTATIONS

3 BIDDING DOCUMENTS

4 BIDDING PROCEDURES

5 CONSIDERATION OF BIDS

6 POST-BID INFORMATION

7 PERFORMANCE BOND AND PAYMENT BOND

8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

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.

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612™–2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

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User Notes:

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect, which, by additions, deletions, clarifications, or corrections, modify or interpret the Bidding Documents.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- **.1** the Bidder has read and understands the Bidding Documents;
- **.2** the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- **.3** the Bid complies with the Bidding Documents;
- **.4** the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- **.5** the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- **.6** the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall obtain Bidding Documents.)

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§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within ten days after receipt of Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the advertisement or invitation to bid, or in supplementary instructions to bidders.

§ 3.1.4 Bidders shall use complete Bidding Documents in preparing Bids. Neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents.

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

§ 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3 Substitutions

§ 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

§ 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

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§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Addenda will be transmitted.)

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with or identified in the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Edits to entries made on paper bid forms must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change" or as required by the bid form.

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

§ 4.1.8 A Bidder shall incur all costs associated with the preparation of its Bid.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security:

(Insert the form and amount of bid security.)

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

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§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning days after the opening of Bids, withdraw its Bid and request the return of its bid security.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as indicated below:
(Indicate how, such as by website, host site/platform, paper copy, or other method Bidders shall submit their Bid.)

§ 4.3.2 Paper copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address, and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.3 Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

§ 4.3.4 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

§ 4.4.3 After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within two days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:
(State the terms and conditions, such as Bid rank, for returning or retaining the bid security.)

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

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§ 5.2 Rejection of Bids
Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

§ 5.3 Acceptance of Bid (Award)
§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

§ 5.3.2 Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement
Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

§ 6.2 Owner's Financial Capability
A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 Submittals
§ 6.3.1 After notification of selection for the award of the Contract, the Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

.1 a designation of the Work to be performed with the Bidder's own forces;
.2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
.3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements
§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

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§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.
(If Payment or Performance Bonds are to be in an amount other than 100% of the Contract Sum, indicate the dollar amount or percentage of the Contract Sum.)

§ 7.2 Time of Delivery and Form of Bonds
§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS
§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.4 Building Information Modeling Exhibit, if completed:

.5 Drawings

Number	Title	Date

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.6 Specifications

Section	Title	Date	Pages

.7 Addenda:

Number	Date	Pages

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[ ] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017.)

[ ] The Sustainability Plan:

Title	Date	Pages

[ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents listed below:
(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

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Additions and Deletions Report for

AIA® Document A701® – 2018

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.

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SECTION 00 2213
SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

The following supplements modify, change, delete from, or add to the Instructions to Bidders, AIA Document A701 (Current Edition). Where any article of the Instructions to Bidders is modified or any paragraph, subparagraph or clause thereof is modified or deleted by these supplements, the unaltered provisions of that article, paragraph, subparagraph, or clause, shall remain in effect.

MODIFICATIONS TO INSTRUCTIONS TO BIDDERS

ARTICLE 2. - MODIFY THE FOLLOWING:

2.1.3 All Bidders are encouraged to observe the site to fully understand the Scope of the Work and to become familiar with conditions under which the work is to be performed.

Pre-Bid Time, MM-dd-yyyy
Address of Pre-bid

2.1.5 Taxes, Permits and Fees

The Contractor is responsible for obtaining and paying the building permit
Each Prime Bidder shall include, and shall be deemed to have included in the prices quoted in the bid, the amount which it is estimated will be payable by the successful Bidder on account of taxes imposed by any taxing authority upon the sale, purchase or use of materials, supplies or equipment incorporated in the project.
The taxes of the foregoing description shall be paid by the Prime Bidder who is awarded the Contract for the construction of the project.
Fees for special Local, State or Federal inspections relating to Mechanical, electrical, conveying systems and similar installation shall be paid by the Prime Contractor or Sub-contractor to which such inspections apply.

ARTICLE 3. - MODIFY THE FOLLOWING:

3.1.1 Delete paragraph and replace with the following:

Complete digital project bidding documents are available at https://widseth.com. Click “Bid Documents” in the top right corner of your screen or go to www.questcdn.com and enter the Quest project No. #questCDN on the website’s Project Search page. Please contact QuestCDN.com at (952) 233-1632 or info@questcdn.com for assistance in free membership registration, downloading and working with this digital project information. You may download the digital plan documents electronically for $30. An optional paper set of project documents is also available from CES Imaging for a nonrefundable price of $30 plus printing costs. If you choose a paper copy you will get all addenda as paper copies and will be charged for the printing costs. Please make your check payable to CES Imaging and send it to 1701 James Circle N, Brooklyn Center, MN 55430. Please contact CES Imaging Repro Dept at (763) 560-9098 or (800) 831-8587 for pricing and if you have any questions.

3.1.1.1 Add the following paragraph:

Bids will be received by the Owner at the time and place designated in the Project Title Page. Bidders are cautioned to pay close attention to the Bid Form and the explanations of the various bid items.

3.1.2 Delete paragraph and replace with the following:

Bidding documents will be issued to Sub-bidders on a basis similar to Paragraph 3.1.1.

3.3.2.1 Add the following paragraph:

Each Bidder, Sub-bidder, manufacturer and material supplier in submitting his request for substitution agrees that if his proposed material, product, or equipment is approved and subsequently used in the Work, he shall assume all costs incurred on account of additional work and changes required to incorporate his product into the Work, including all such work and changes performed under other contracts.

3.3.5 Add the following paragraph:

The Contractor shall be responsible for fit and clearances of substituted items and for making any modifications in his/her work or the work of other contractors necessitated by the use of any substitution, without cost to the Owner or other affected contractors.

ARTICLE 4. - ADD THE FOLLOWING:

4.1.2.1 If blank space is not required, state “Not Applicable (NA)”. If the Alternate has the option of being an “Add” or “Deduct”, and if the option is not indicated, it will be assumed to be an “Add.”

4.1.5.1 Alternates

Bidder shall quote all Alternates applicable to his representative Contract division.

The Owner reserves the right to reject all Alternates, or to accept Alternates if applicable at time of Contract award.

4.1.8 No persons, firm, or corporation shall be allowed to make, file or be interested in more than one bid for the same work, unless alternate bids are called for.

4.4.1.1 A bid may not be modified, withdrawn, or canceled by the Bidder within forty-five (45) days after the date fixed for receipt of Bids and Bidder so agrees in submitting his bid.

4.4.5 Alternate Bids will not be considered unless specified on the Bid. A Conditional or Qualified Bid will not be accepted.

ARTICLE 5 - ADD THE FOLLOWING:

5.3.2.1 Alternates shall be held open and valid for sixty (60) days.

5.3.3 BID EVALUATION

In evaluating the documents, the Owner shall consider the qualification of the Bidder; compliance with the prescribed requirements; and Alternates, if requested. The Owner may conduct such investigations as he deems necessary to assist in the evaluation and to establish the responsibility, qualifications and final ability to the Bidder, proposed Subcontractors and other persons and organizations to do the work. The selected Bidder shall supply the names and addresses of major material suppliers and subcontractors when required to do so by the Owner. If a Contract is to be awarded, it will be awarded to the lowest Bidder/Proposer whose evaluation by the Owner indicates that the award, with or without any combination of Alternates and bid items, will be in the best interest of the Owner. Should there be reasons why the Contract cannot be awarded within the specified time, the time may be extended by mutual agreement between the Owner and the Bidder.

5.3.4 NOTICE TO PROCEED:

The Notice to Proceed shall be issued within ten (10) days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the Owner and the Contractor. If the Notice to Proceed has not been issued with the ten (10) day period or within the period mutually agreed upon, the Contractor may by written notice terminate the agreement without further liability on the part of either party. Such Notice of Termination shall be effective upon receipt of the Notice by the Owner.

The work, if awarded, is subject to the limitations of funds, and the Owner reserves the right to reduce the quantity of the work to be accomplished under the Contract to that dictated by the funds available. The work to be eliminated in order to achieve this reduction will be determined by the Owner.

5.3.5 CONTESTING THE RESULTS

Proposers contesting the results of the scoring shall have seven (7) calendar days from the date in which the scoring results are announced to contest the results. Proposers shall contest the results in writing to the Owner and Architect stating the specific item being contested and include all supporting documentation supporting their case. Owner shall review the information provided and respond in writing accordingly.

ARTICLE 6 - ADD THE FOLLOWING:

6.1.1 The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the Work contemplated therein.

6.1.2 Selected Bidders may be required to furnish Contractor Qualification Statement, additional cost information, list of subcontractors and suppliers, and any other information the Owner may request. Such information shall be furnished within five (5) calendar days from the date of receipt of bid, and in the form prescribed by the Architect.

6.1.3 The Contractor must submit from the State Tax Commissioner a Certificate of Income Tax Clearance before the Owner can enter into a Contract. Before the Contractor enters into a contract with a Sub-contractor he shall obtain from him/her such a certificate.

6.3.5 NOTICE OF AWARD

This Bidder shall be required to execute the Agreement and obtain the Performance Bond, Labor and Material, Payment Bond and Project Insurance within ten (10) calendar days from the date when Notice of Award is delivered to the Bidder.

ARTICLE 7 - ADD THE FOLLOWING:

7.1.1.1 Performance Bond and Payment Bond.

Contractor shall pay the premium for and furnish Performance Bond and Labor and Material Payment Bond in the amount of the Contract and payment to cover faithful performance of Contract and payment of all obligations arising thereunder. The bond shall be in force during the construction period and for one year guarantee period following. Bonds shall be submitted using AIA Document A312. The Bonding Company shall be approved by the State in which the project is located to carry on business in that State. The Performance and Payment Bond and Labor and Material Bond shall be in an amount equal to 100% of the contract price and shall guarantee the faithful performance of the contract in accordance with the Contract Documents.

7.1.4 A Performance and a Labor and Materials Payment Bond each in the amount of 100 percent of the Contract price, with a corporate surety approved by the Owner, will be required for the faithful performance of the Contract.

7.2.5 Bids which are signed for a co-partnership shall be signed by one of the co-partners or by an attorney-in-fact. If signed by an attorney-in-fact, there shall be attached to the Bid a power-of-attorney evidencing authority to sign the Bid.

7.2.6 Bids which are signed for a corporation shall have the correct corporation name thereof shown and the signature of the president or other authorized officer of the corporation. If such Bid is manually signed by an officer other than the president of the corporation, a certified copy of a resolution of the Board of Directors evidencing the authority of such official to sign the Bid shall be attached to the Bid.

ARTICLE 9 - ADD THE FOLLOWING:

PROJECT INSURANCE:

The Contractor shall purchase insurance for this project in accordance with the General Conditions and Supplementary Conditions. The Contractor shall file an acceptable Certificate of Insurance and Insurance policy with the Owner prior to the Owner executing and returning the signed Owner Agreement to the Contractor.

Certificate of Insurance shall be ACORD form, Certificate of Insurance.

END OF SECTION

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SECTION 00 3100
AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 EXISTING CONDITIONS

A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of Contract Documents, as follows:

B. Hazardous Material Survey: Entitled Asbestos Survey, East Grand Forks Fire Department Station #2, Trio Project #T25-150, dated July 3, 2025.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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Asbestos Survey

East Grand Forks Fire Department
Station #2
243 5th Ave SE
East Grand Forks, MN

July 3, 2025

Trio Project #T25-150

Prepared By:

Trio Environmental Consulting, Inc.
133 Main Ave W Suite 201, West Fargo, ND 58078
(701) 492-9224 • (701) 492-9228 (Fax)

Asbestos Survey

Location:
Fire Station #2
243 5th Ave SE
East Grand Forks, MN 56721

Client:

East Grand Forks Fire Department
415 4th St NW
East Grand Forks, MN 56721

THIS REPORT IS PREPARED FOR USE BY:

Jeff Boushee
Fire Chief/Emergency Manager
East Grand Forks Fire Department
415 4th St NW
East Grand Forks, MN 56721

I hereby certify that this Inspection and subsequent report was prepared by me and that I am accredited in the State of North Dakota under the Asbestos Hazard Emergency Response Act law P.L. 99-519 in the following disciplines: Building Inspector, Site Supervisor, and Project Monitor.

Adam Seamands
North Dakota Asbestos Inspector #7063

Date: 7/3/2025

Expiration Date: 2/6/2026

Trio Environmental Consulting, Inc.
133 Main Ave West, Suite 201
West Fargo, ND 58078
(701) 492-9224 • FAX: (701) 492-9228

ASBESTOS SURVEY

TABLE OF CONTENTS

NARRATIVE REPORT		PAGE
1.0	INTRODUCTION / BACKGROUND	1
2.0	SUMMARY OF FINDINGS	1
2.1	ASBESTOS	1
3.0	STANDARDS REGULATING ASBESTOS	2
3.1	ENVIRONMENTAL PROTECTION ACENCY (EPA)	2
3.2	OCCUPATIONAL SAFETY and HEALTH ADMINISTRATION (OSHA)	2
3.3	NORTH DAKOTA DEPARTMENT OF HEALTH	3
4.0	SURVEY METHODS	3
4.1	LAB ANALYSIS PROCEDURE	3
4.2	ASBESTOS BULK SAMPLING	3
5.0	RECOMMENDATIONS	3
6.0	STANDARD OF CARE	3

Asbestos Laboratory Analysis	Appendix I
Sample Location Drawing	Appendix II
Asbestos Location Drawing	Appendix III
Certificates/Licenses	Appendix IV

NARRATIVE REPORT

1.0 INTRODUCTION / BACKGROUND

Trio Environmental Consulting, Inc. (Trio) was contracted to perform an asbestos survey of fire station #2 at 243 5th Ave SE in East Grand Forks, MN.

Location will be having renovations completed in the next year.

The purpose of the survey is to identify asbestos containing building materials (ACBM) prior to renovation activities. Adam G Seamands of Trio conducted the site survey at which time materials were identified, samples collected for lab analysis, and materials quantified for inclusion in this report.

The following report is a general overview of the observations, methodology, and material sample analysis results for this property as noted and obtained by Trio.

2.0 SUMMARY OF FINDINGS

2.1 ASBESTOS

Black mastic, window glazing and block fill insulation are positive for asbestos and must be abated prior to renovation activities if materials will be affected or disturbed. As-built drawings indicate a 12" transite pipe 4" below surface of concrete in Apparatus Room as well as a transite lined duct in ceiling of Apparatus Room; transite is an asbestos containing building material(ACBM) and must be abated prior to renovation activities if they will be disturbed.

Black mastic was found in vestibule beneath carpet squares, in kitchen, office and corridor beneath floor tile. Floor tile will need to be abated with black mastic being the two are adhered to each other.

Block fill vermiculite insulation was found in various places in exterior walls, if any penetrations are made to exterior walls during renovation activities an abatement crew must first remove insulation.

Window glazing was found at front entry; asbestos location drawing will show location of windows with asbestos containing window glazing.

Transite pipe and transite duct are shown on asbestos location drawing.

28 samples were obtained at this facility.

Appendix I includes the lab analysis results for each sampled material including the chain of custody.

Appendix II includes sample location drawing.

Appendix III includes asbestos location drawing.

Appendix IV includes copies of current Licensing, Certifications and Insurance.

3.0 STANDARDS REGULATING ASBESTOS

3.1 ENVIRONMENTAL PROTECTION ACENCY (EPA)

The EPA's National Emission Standard for Hazardous Air Pollutants (NESHAPs), is designed to protect the general public from airborne emissions of particulate asbestos. The standard requires parties conducting asbestos-related activities to follow certain procedures and adopt specific work practices to prevent the release of asbestos to the outside air. The Minnesota Pollution Control Agency oversees the removal, transport and disposal of ACM as per EPA's NESHAP Regulation.

This standard requires that regulated asbestos-containing materials (RACM) must be removed from buildings and building components prior to demolition or renovation of the building. RACM includes all friable asbestos-containing materials, Category I nonfriable asbestos-containing materials that have become friable, Category I nonfriable asbestos-containing materials that have been subjected to sanding, grinding, cutting, or abrading, and Category II nonfriable asbestos-containing materials that have a high probability of becoming or have become crumbled, pulverized, or reduced to powder by the forces expected to act on the materials in the course of demolition or renovation operations.
This standard also requires advance notification, wet removal techniques, and proper disposal of asbestos waste. The EPA's Clean Water Act regulates the discharge of asbestos and other pollutants to publicly owned sewer systems.

3.2 OCCUPATIONAL SAFETY and HEALTH ADMINISTRATION (OSHA)

OSHA regulations consist of two separate standards regulating occupational exposure to asbestos, described by OSHA as the "general industry standard" and the "construction standard".

The general industry standard applies to workplaces in all industries, with the exception of construction work, and thus governs the obligations of commercial employers to maintain a work environment free of asbestos hazards.

The construction standard applies to construction work, and thus governs the obligations of construction employers engaged in a wide variety of asbestos-related activities (e.g., demolition, renovation, repair, storage or containment). Both standards require the employer to ensure that no employee "is exposed to an airborne concentration of asbestos in excess of 0.1 fibers per cubic centimeter, (f/cc) of air as an eight (8) hour time weighted average (TWA)".

Both standards generally impose requirements pertaining to methods of compliance, personal protective equipment, employee monitoring, medical surveillance, communication to employees, regulated areas, engineering controls, work practices, housekeeping procedures and record keeping. These standards also establish an "action level" which is defined as "an airborne concentration of asbestos of 0.1 f/cc calculated as an (8)-hour TWA. Under both standards, if employees are exposed at or above the action level, the employer must initiate specified compliance activities (air monitoring, employee training, and medical surveillance). Employers must also ensure that no employee is exposed to OSHA's excursion limit of one (1) f/cc of air averaged over a thirty minute sampling period.

Building owners, as employers, are subjected to the general industry standard. In explanation of the asbestos standards, OSHA made it clear that the standards are applicable to office employees in buildings where asbestos products have been installed and to employees who work in the vicinity of asbestos abatement and renovation activities.

Under these regulations, every employer who has a workplace or work operation subject to the general industry stand is required to perform initial exposure monitoring of employees who are, or may reasonably be expected to be, exposed to airborne concentrations at or above the action level. The regulations do not describe the circumstance in which it "may reasonably be expected" that employees are exposed at or above the action level. However, OSHA has indicated that "visible evidence of deterioration of asbestos materials and construction or maintenance activities which would disturb asbestos materials" would trigger the obligation to conduct air monitoring in the workplace. Finally, OSHA requires all asbestos waste, scrap, debris, bags, containers and equipment be disposed of in sealed, impermeable bags or containers.

3.3 NORTH DAKOTA DEPARTMENT OF HEALTH

The removal of friable ACM and non-friable ACM, (with a high probability of becoming friable), is regulated by the North Dakota Department of Health's Asbestos Abatement Rules. These rules require a ten-day notification prior to conducting renovation or demolition activities and define the air-monitoring requirements, use of engineering controls and use of licensed contractors with certified workers for asbestos abatement projects. For additional information, please refer to www.ndhealth.gov.

4.0 SURVEY METHODS

4.1 LAB ANALYSIS PROCEDURE

A total of 28 samples were collected and submitted for analysis to EMC Laboratories, 9830 S. 51st St., Suite B-109, Phoenix, AZ, where they were analyzed for asbestos content using Polarized Light Microscopy (PLM). Bulk asbestos analysis results are located in Table 1 of this report. Any material reporting asbestos concentrations of 1% or greater is considered to be ACBM. The current approved method used for bulk sample analysis is EPA's "Method for the Determination of Asbestos in Bulk Building Materials, EPA 600/R-93/116 (1993).

In each homogeneous sampling area, once a positive sample was identified, the remaining samples were not analyzed.

4.2 ASBESTOS BULK SAMPLING

Appendix I identifies all asbestos bulk samples and lab results for each sampled homogeneous material from the current inspection.

5.0 RECOMMENDATIONS

ASBESTOS

Floor tile and corresponding adhesive, window glazing, block fill insulation, transite pipe and transite lined duct must be abated before renovation activities may begin if materials will be affected.

6.0 STANDARD OF CARE

The degree of care and technical skills exercised by **Trio Environmental Consulting, Inc.** was consistent with agreed upon state-of-the-art practices for this type of project, under similar conditions. Recommendations and conclusions contained in this report represent a professional judgment at the time the project was undertaken.

No warranty is intended or implied.

Please feel free to contact **Trio Environmental Consulting, Inc.** at (701) 492-9224 if there are any questions or concerns regarding the fieldwork, sample results or presented findings.

Sincerely,

Adam G. Seamands
Trio Environmental Consulting, Inc.

Appendix I

Asbestos Laboratory Analysis

Page of

CHAIN OF CUSTODY

EMC Laboratories
9830 S. 51ST St., Ste B-109
Phoenix, AZ 85044
(800) 362-3373 Fax (480) 893-1726

LAB#: 333959
TAT: 1 day
Rec'd: JUL 01 AM

COMPANY NAME: TRIO ENVIRONMENTAL CONSULTING, INC
133 Main Ave. West # 201
West Fargo, ND 58078

BILL TO: (If Different Location)

CONTACT:
Phone/Fax: (701) 492-9224 / (701) 492-9228
Email: trioenvironment@aol.com

Now Accepting: VISA – MASTERCARD Price Quoted: $___ / Sample $_____ / Layers

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

1. TURNAROUND TIME: [4hr rush] [8hr rush] [1-Day] [2-Day] [3-Day] [5-Day] [6-10 Day]
****Prior confirmation of turnaround time is required
****Additional charges for rush analysis (please call marketing department for pricing details)
****Laboratory analysis may be subject to delay if credit terms are not met
2. TYPE OF ANALYSIS: [Bulk-PLM] [Air-PCM] [Lead] [Point Count] [Fungi: AOC, W-C, Bulk, Swab, Tape]
3. DISPOSAL INSTRUCTIONS: [Dispose of samples at EMC] / [Return samples to me at my expense]
(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

4. Project Name: East Grand Forks Fire Station #2
P.O. Number: _____ Project Number: T25-150

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No	AIR SAMPLE INFO / COMMENTS ON	OFF	FLOW RATE
1	-See Attached-	6/30		Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
20				Y N			

SPECIAL INSTRUCTIONS: Test, til Positive

Sample Collector: (Print) Adam Seamands (Signature) Adam Seamands

Relinquished by: _____ Date/Time: 6/30 Received by: Doreen Celaya Date/Time: 7/1/25

Relinquished by: Doreen Celaya Date/Time: 7/1/25 Received by: _____ Date/Time: JUL 0 1 2025

Relinquished by: _____ Date/Time _____ Received by: _____ Date/Time: _____

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.

Rev. 09/01/08

333959

TRIO ENVIRONMENTAL CONSULTING, INC.
Bulk Samples
Chain of Custody

Client: East Grand Forks Fire Department
Project Name: Fire Station #2 @ 243 5th Ave SE, East Grand Forks, MN 56721
Project #: T25-150
Inspector: Adam Seamands
Date: 6/30/2025

Lab #	Sample #	Material Type	Sample Location
1	1A	2x4 Ceiling Tile	Kitchen
2	1B	2x4 Ceiling Tile	Office
3	2A	1x1 Floor Tile	East Corridor
4	2B	1x1 Floor Tile	Kitchen
5	3A	Vinyl Cove Base- Light Brown	Corridor
6	3B	Vinyl Cove Base- Light Brown	West Corridor
7	4A	Vinyl Cove Base- Dark Brown	SW Bunk Room
8	4B	Vinyl Cove Base- Dark Brown	NW Bunk Room
9	5A	Sheetrock	Kitchen
10	5B	Sheetrock	Office
11	6A	Roof Membrane	Roof
12	6B	Roof Membrane	Roof
13	7A	Mudded Pipe Fitting	Storage
14	7B	Mudded Pipe Fitting	Storage
15	8A	Transite	Exhaust System
16	8B	Transite	Exhaust System
17	9A	Black Mastic	Vestibule
18	9B	Black Mastic	Vestibule
19	10A	Carpet Adhesive	Bunk Room
20	10B	Carpet Adhesive	Bunk Room

Sampled By Adam Seamands Date 6/30/2025
Received By Doreen Celaya Date 7/1/26

333959

ENVIRONMENTAL CONSULTING, INC.
Bulk Samples
Chain of Custody

Client: East Grand Forks Fire Department
Project Name: Fire Station #2 @ 243 5th Ave SE, East Grand Forks, MN 56721
Project #: T25-150
Inspector: Adam Seamands
Date: 6/30/2025

Lab #	Sample #	Material Type	Sample Location
21	11A	Door Caulking	East Entrance
22	11B	Door Caulking	NE Entrance
23	12A	Window Glazing	NE Entrance
24	12B	Window Glazing	South Entrance
25	13A	Window Caulking	SW Corner
26	13B	Window Caulking	SW Corner
27	14A	Vermiculite	Bsmt
28	14B	Vermiculite	Interior

Sampled By Adam Seamands Date 6/30/2025
Received By Doreen Celaya Date 7/1/25

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0333959

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP# 101926-0

Client:	TRIO ENVIRONMENTAL	Job# / P.O. #:	T25-150
Address:	133 MAIN AVE WEST, STE 201__	Date Received:	07/01/2025
	WEST FARGO, ND 58078	Date Analyzed:	07/02/2025
Collected:	06/30/2025	Date Reported:	07/02/2025
Project Name:	EAST GRAND FORKS FIRE STATION #2	Submitted By:	ADAM SEAMANDS
Address:		Collected By:	
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0333959-001 1A	KITCHEN	2x4 Ceiling Tile, White/ Beige	No	None Detected	Cellulose Fiber 70% Mineral Wool 10% Carbonates Perlite Non-Fibrous Binder/Filler 20%
0333959-002 1B	OFFICE	2x4 Ceiling Tile, White/ Beige	No	None Detected	Cellulose Fiber 75% Mineral Wool 5% Carbonates Perlite Non-Fibrous Binder/Filler 20%
0333959-003 2A	EAST CORRIDOR	LAYER 1 1x1 Floor Tile, White/ Gray Streaks	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 2 Mastic, Beige/ Tan	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
0333959-004 2B	KITCHEN	LAYER 1 1x1 Floor Tile, White/ Gray Streaks	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 2 Mastic, Yellow/ Black	Yes	Chrysotile 3%	Carbonates Quartz Non-Fibrous Binder/Filler 97%

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Address:		Collected By:	
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0333959-005 3A	CORRIDOR	LAYER 1 Vinyl Covebase, Lt. Brown	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 2 Mastic, Lt. Yellow	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
0333959-006 3B	WEST CORRIDOR	LAYER 1 Vinyl Covebase, Lt. Brown	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 2 Mastic, Lt. Yellow	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
0333959-007 4A	SW BUNK ROOM	LAYER 1 Vinyl Covebase, Dk. Brown	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 2 Mastic, Lt. Yellow	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%

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Address:		Collected By:	
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	(%)
0333959-008 4B	NW BUNK ROOM	LAYER 1 Vinyl Covebase, Dk. Brown	No	None Detected		Carbonates Quartz Non-Fibrous Binder/Filler	100%
		LAYER 2 Mastic, Lt. Yellow	No	None Detected		Carbonates Quartz Non-Fibrous Binder/Filler	100%
0333959-009 5A	KITCHEN	Sheetrock/ Paint, White/ Brown/ Beige Note: No Joint Compound or Texture Present in Sample	No	None Detected		Cellulose Fiber Gypsum Carbonates Non-Fibrous Binder/Filler	10% 90%
0333959-010 5B	OFFICE	LAYER 1 Sheetrock, White/ Brown	No	None Detected		Cellulose Fiber	12%
		LAYER 2 Texture, White Note: Very small amount of texture	No	None Detected		Cellulose Fiber Carbonates Quartz Non-Fibrous Binder/Filler	1% 99%
0333959-011 6A	ROOF	Roof Membrane / Glue, Black / Clear-Yellow Note: Difficult to separate adjacent layer	No	None Detected		Carbonates Non-Fibrous Binder/Filler	100%
0333959-012 6B	ROOF	Roof Membrane / Glue, Black / Clear-Yellow Note: Difficult to separate adjacent layer	No	None Detected		Carbonates Non-Fibrous Binder/Filler	100%

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Project Name:	EAST GRAND FORKS FIRE STATION #2	Submitted By:	ADAM SEAMANDS
Address:		Collected By:	
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0333959-013 7A	STORAGE	LAYER 1 Mudded Pipe Fitting, Beige	No	None Detected		Mineral Wool Gypsum Perlite Non-Fibrous Binder/Filler	80% 20%
		LAYER 2 Wrap, White	No	None Detected		Cellulose Fiber Carbonates Non-Fibrous Binder/Filler	90% 10%
0333959-014 7B	STORAGE	LAYER 1 Mudded Pipe Fitting, Beige	No	None Detected		Mineral Wool Gypsum Perlite Non-Fibrous Binder/Filler	80% 20%
		LAYER 2 Wrap, White	No	None Detected		Cellulose Fiber Carbonates Non-Fibrous Binder/Filler	90% 10%
0333959-015 8A	EXHAUST SYSTEM	Transite, Brown Note: Exhaust System	No	None Detected		Cellulose Fiber Gypsum Quartz Non-Fibrous Binder/Filler	5% 95%
0333959-016 8B	EXHAUST SYSTEM	Transite, Brown Note: Exhaust System	No	None Detected		Cellulose Fiber Gypsum Quartz Non-Fibrous Binder/Filler	5% 95%
0333959-017 9A	VESTIBULE	Mastic, Black	Yes	Chrysotile	5%	Carbonates Quartz Non-Fibrous Binder/Filler	 95%

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Address:		Collected By:	
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0333959-018 9B	VESTIBULE	Mastic, Black Note: *Not analyzed per client request			
0333959-019 10A	BUNK ROOM	Carpet Adhesive, Yellow	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
0333959-020 10B	BUNK ROOM	Carpet Adhesive, Yellow	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
0333959-021 11A	EAST ENTRANCE	Door Caulk, White	No	None Detected	Fibrous Glass 1% Carbonates Quartz Non-Fibrous Binder/Filler 99%
0333959-022 11B	NE ENTRANCE	Door Caulk, White	No	None Detected	Fibrous Glass 1% Carbonates Quartz Non-Fibrous Binder/Filler 99%
0333959-023 12A	NE ENTRANCE	Window Glazing, Dk. Gray	No	None Detected	Silicone Carbonates Non-Fibrous Binder/Filler 100%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0333959

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP# 101926-0

Client:	TRIO ENVIRONMENTAL	Job# / P.O. #:	T25-150
Address:	133 MAIN AVE WEST, STE 201__	Date Received:	07/01/2025
	WEST FARGO, ND 58078	Date Analyzed:	07/02/2025
Collected:	06/30/2025	Date Reported:	07/02/2025
Project Name:	EAST GRAND FORKS FIRE STATION #2	Submitted By:	ADAM SEAMANDS
Address:		Collected By:	
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0333959-024	SOUTH ENTRANCE	Window Glazing, White	Yes	Chrysotile	8%		
12B						Carbonates	
						Quartz	
						Non-Fibrous Binder/Filler	92%
0333959-025		Window Caulk, Lt. Gray	No	None Detected		Fibrous Glass	1%
13A						Carbonates	
						Quartz	
						Non-Fibrous Binder/Filler	99%
0333959-026		Window Caulk, Lt. Gray	No	None Detected		Fibrous Glass	1%
13B						Carbonates	
						Quartz	
						Non-Fibrous Binder/Filler	99%
0333959-027		Vermiculite, Silver / Gold	Yes	Tremolite	2%		
14A						Mica	
						Gypsum	
						Carbonates	98%
0333959-028		Vermiculite, Silver / Gold					
14B		Note: *Not analyzed per client request					

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
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Address:		Collected By:	
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents

Analyst - Matt Kettler

Signatory - Lab Director - Kurt Kettler

Distinctly stratified, easily separable layers of samples are analyzed as subsamples of the whole and are reported separately for each discernible layer. All analyses are derived from calibrated visual estimate and measured in area percent unless otherwise noted. The report applies to the standards or procedures identified and to the sample(s) tested. The test results are not necessarily indicative or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. This report is for the exclusive use of the addressed client and will not be reproduced wholly or in part for advertising or other purposes over our signature or in connection with our name without special written permission. The report shall not be reproduced except in full, without written approval by our laboratory. The samples not destroyed in testing are retained a maximum of sixty days. The laboratory measurement of uncertainty for the test method is approximately less than 1 by area percent. Accredited by the National Institute of Standards and Technology, Voluntary Laboratory Accreditation Program for selected test method(s) for asbestos. The Client/Customer supplies the following information for this report: The Project Name, Address, Collection Date/Time, Sample Collector, Job/PO Number, Client Sample Identification and Sample Location. The accreditation or any reports generated by this laboratory in no way constitutes or implies product certification, approval, or endorsement by the National Institute of Standards and Technology. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

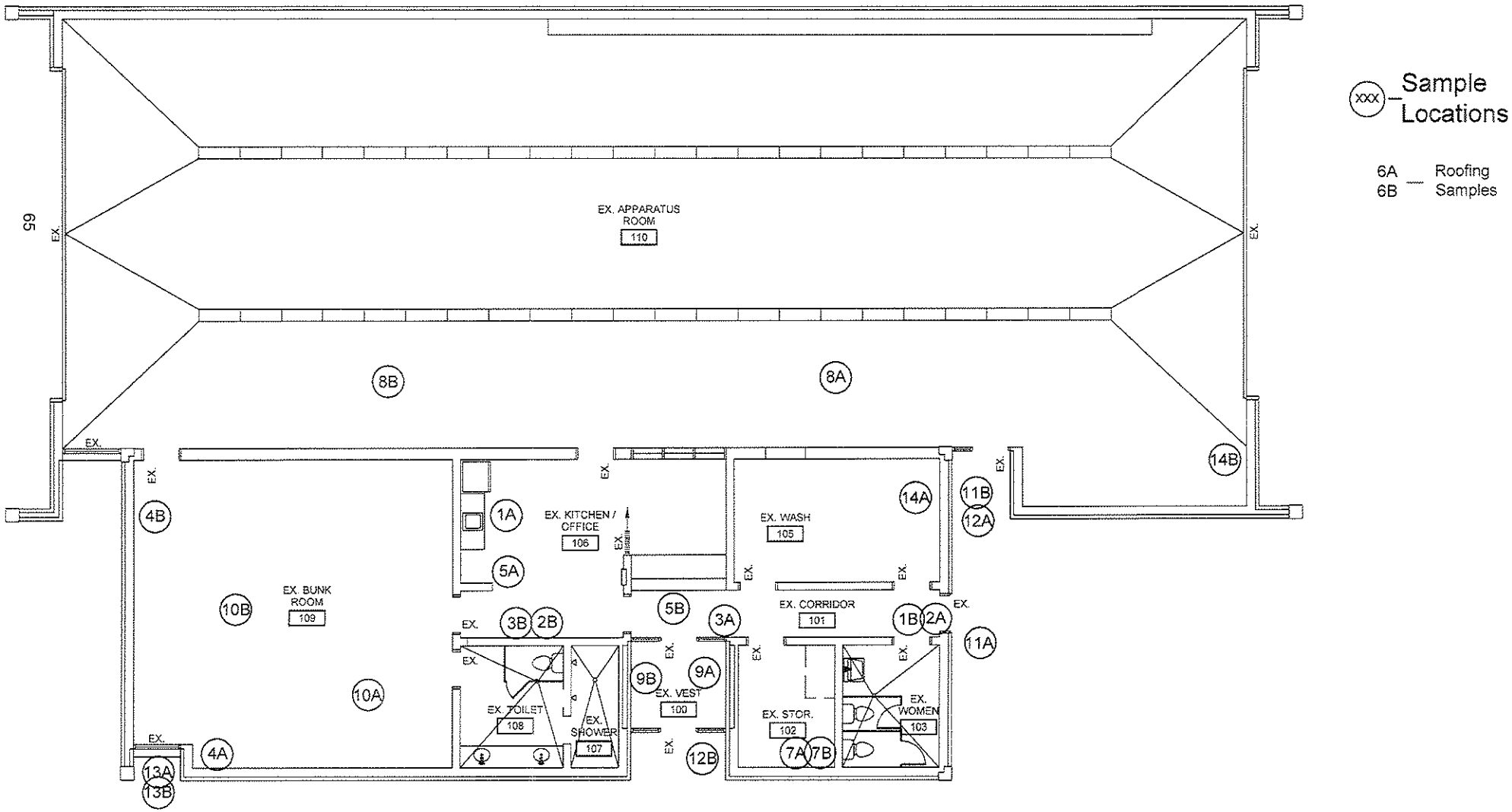
Appendix II

Sample Location Drawing

Trio Environmental Consulting
133 Main Ave, Suite 201
West Fargo, ND 58078

Fire Station #2
243 5th Ave SE
East Grand Forks, MN 56721

Page: 1 of 1



(xxx) – Sample Locations

6A — Roofing
6B — Samples

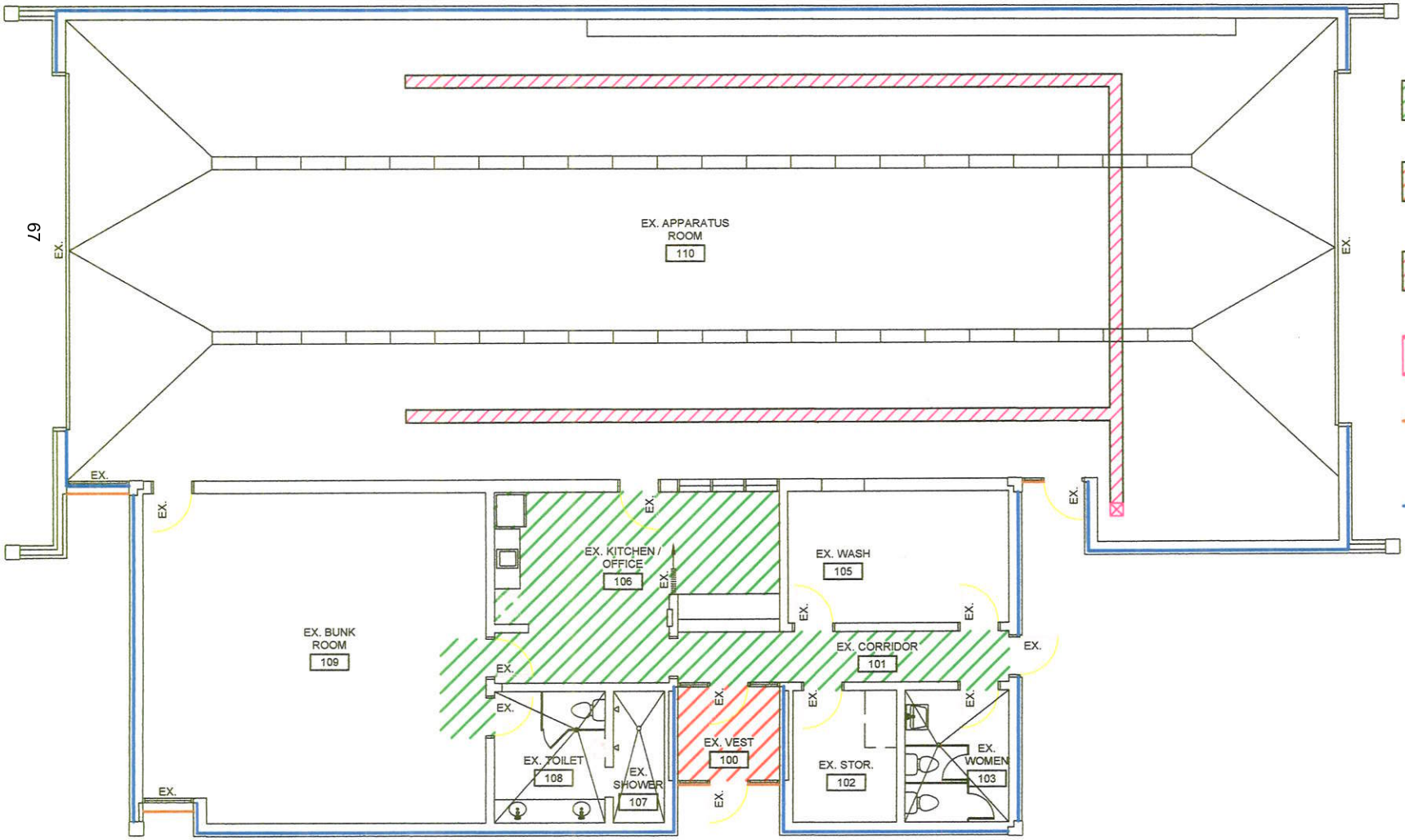
Appendix III

Asbestos Location Drawing

Trio Environmental Consulting
133 Main Ave, Suite 201
West Fargo, ND 58078

Fire Station #2
243 5th Ave SE
East Grand Forks, MN 56721

Page: 1 of 1



Asbestos Locations

- Black mastic under tile (438 Sq Ft)
- Black mastic under carpet (59 Sq Ft)
- Underground Transite Pipe in Exhaust system (12" Pipe 145 LF)
- Transite Lined Duct
- Window glazing (5 each)
- Vermiculite block fill insulation (exterior walls)

Appendix IV

Certificates/Licenses

State of North Dakota
SECRETARY OF STATE

CONTRACTOR LICENSE

NO: 30524
CLASS: D

The undersigned, as Secretary of State of the state of North Dakota and Registrar of Contractors, certifies that TRIO ENVIRONMENTAL CONSULTING, INC. whose address is in WEST FARGO, ND, has filed in this office proper documents for a Contractor License valid until March 1, 2026, and has complied with all requirements of North Dakota Century Code, chapter 43-07.

TRIO ENVIRONMENTAL CONSULTING, INC. is entitled to bid on and accept contracts as authorized by law under this license provided that any single contract project may not exceed $100,000 in value.

Dated: January 2, 2025

Michael Howe
Secretary of State

Asbestos Contractor License

Minnesota Department of Health

St Paul, MN

Trio Environmental Consulting, Inc.
133 Main Ave West # 201
West Fargo, ND 58078

Responsible Individual: Thomas Gentzkow

This license is valid from November 22, 2024 to November 22, 2025

Pursuant to Minnesota Statutes, section 144.99, this license may be suspended or revoked for failure to conduct asbestos-related work in compliance with applicable regulations.

Asbestos-related work bust be conducted according to Minnesota Statutes, sections 326.70 to 326.81 and Minnesota Rules, parts 4620.000 to 4620.3724.

License Number: ACL-158

Dr. Brooke Cunningham
Commissioner

DEPARTMENT OF HEALTH

DEPARTMENT OF HEALTH

Asbestos Inspector Certification

Minnesota Department of Health

Number ASB-2493
Adam Seamands
3620 42nd Str S Apt 107
Fargo, North Dakota 58104

Issue Date:
February 12, 2025

Expiration Date:
February 6, 2026

DEPARTMENT OF HEALTH

Asbestos Supervisor Certification

Minnesota Department of Health

Number ASB-2494
Adam Seamands
3620 42nd Str S Apt 107
Fargo, North Dakota 58104

Issue Date:
February 10, 2025

Expiration Date:
February 4, 2026

North Dakota Department of Environmental Quality

Adam G Seamands

Certificate No: 7063

This is to certify that the above individual has met the requirements f certification in the following asbestos abatement discipline(s):

X	Supervisor	Exp: 2/4/2026
	Worker	
X	Inspector	Exp: 2/6/2026
	Management Planner	
	Project Designer	
X	Project Monitor	Exp: 2/4/2026

Asbestos Control Progra

SECTION 00 4100
BID FORM

THE PROJECT AND THE PARTIES

BID SUBMITTED TO:

City of East Grand Forks

Attn: Jeff Boushee, Fire Chief

600 Demers Avenue

East Grand Forks, MN 56721

DATE: _____ (BIDDER TO ENTER DATE)

SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)

Bidder's Full Name: _____

Address: _____ _____

City, State, Zip: _____ _____

The undersigned, in compliance with your construction documents for the Fire Station No. 2 - Remodel dated 01-09-2026 as prepared by WiDSETH, and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, and supplies, and to construct the project in accordance with the contract documents, within the time set forth herein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the contract documents, of which this proposal is a part.

BID ITEM - BASE BID

Lump Sum bid for the Fire Station No. 2 - Remodel, in accordance with Specifications and Drawings.

Base Bid: _____ dollars ($_____), in lawful money of the United States of America.

TIME OF COMPLETION

I (We) do hereby propose to complete all work described in the plans and specifications within _____ calendar days following the issuance of the Notice to Proceed.

ADDENDA

The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.

Addendum # _____ Dated _____.
Addendum # _____ Dated _____.

RESPONSIBLE CONTRACTOR CERTIFICATION AND RESPONSE FORM:

I (We) do hereby acknowledge the inclusion of the Responsible Contractor Certification and Response Form found in Section 00 4114 as required by the State of Minnesota. _____ (initial)

CERTIFICATION:

I (We) hereby certify that I am (we are) the only person(s) interested in this proposal as principal(s); that this proposal is made and submitted without fraud or collusion with any other persons, firm or corporation whatsoever. The Bidder hereby declares that he has carefully examined all Bidding and Contract Documents, Plans and Specifications, and that he has personally inspected the actual location of the work, and local sources of supply, has satisfied himself as to all the quantities and conditions, and understands that in signing this Bid he waives all right to plead any misunderstanding regarding the same. _____ (initial)

PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND:

I (We) propose to execute the form of Contract and to furnish a Performance Bond and Labor and Material Payment Bond each in the amount of the Contract within ten (10) days of execution of contract as security for the construction and completion of the Work in accordance with the terms of the Contract, plans and specifications. _____ (initial)

GUARANTEE:

I (we) further propose to guarantee all work performed under this Contract to be done in accordance with the plans and specifications in a good and workmanlike manner; and to renew or repair any work which may be rejected, due to defective materials or workmanship, prior to final completion and acceptance of the project. _____ (initial)

BID SECURITY:

Enclosed herewith is a certified check_____, cashier's check_____, bidder's bond_____, U.S. Government Bonds_____,(check one) in the amount of: _____Dollars($_____), being at least 5% of the amount of the proposal, made payable to the Owner as a proposal guarantee which it is agreed by the undersigned will be forfeited to the Owner as Liquidated Damage in the event I (We) fail to enter into a Contract or the furnish the required Performance and Labor and Material Payment Bond within the time period specified after acceptance of the Bid by the Owner.

BID GUARANTEE:

The undersigned proposes that the prices stated in this proposal are guaranteed firm for a minimum of 45 consecutive calendar days, Sundays and holidays included, from the date hereof; and if authorized to proceed within that period the undersigned agrees to execute a formal contract with the owner for the performance of the aforementioned work at the stated price.

BID ACCEPTANCE:

I (We) acknowledge the Owner's right to accept any bid, reject any or all bids or to waive any informalities or irregularities in bidding. _____ (initial)

ADDRESS, LEGAL STATUS AND SIGNATURE OF BIDDER:

The undersigned Bidder does hereby designate the address given below as the legal address to which all notices, directions or other communications may be served or mailed.

Street_____

City_____State_____Zip_____

The undersigned Bidder does hereby declare that the Bidder has the legal status checked below:

_____Individual
_____Co-Partnership
_____Corporation, incorporated under the laws of the State of _____.

The names and addresses of all persons indicated as partners in this proposal are as follows:

NAME	ADDRESS
_____	_____
_____	_____
_____	_____

BID SUBMISSION:

The sealed bids are to be submitted as indicated in Section 00 1113 Advertisement For Bids. Bids will be opened publicly immediately thereafter.

This Proposal is submitted in the name of

By_____ (Signature)

Title_____

Signed and sealed this_____ day of _____, 20_____.

END OF SECTION

SECTION 00 4114
RESPONSIBLE CONTRACTOR CERTIFICATION AND RESPONSE FORM
FIRE STATION NO. 2 - REMODEL

NAME OF BIDDER/CONTRACTOR:_____

Minnesota Statute Section 16C.285 requires Contractors to meet minimum criteria to be eligible to be awarded a construction contract as the lowest responsible bidder or best value contractor for projects estimated to exceed $50,000. This statute also requires subcontractors to meet minimum criteria to be eligible to receive an award for subcontract work on the project.

The term 'Bidder or Contractor' as used in this form means a contractor as defined in Minnesota Statues, Section 16C.285, subdivision 3.

Minimum Criteria: Bidder/Contractor shall indicate they have read and verified they are in compliance with the following statements:

1. Is in compliance with workers' compensation and unemployment insurance requirements Pursuant to the State of Minnesota and as required in the contract documents.
2. Is registered with the Department of Revenue and Department of Employment and Economic Development as we have employees.
3. Has a valid federal tax identification number or a valid Social Security number if an individual.
4. Has filed a certificate of authority to transact business in Minnesota with the Secretary of State if a foreign corporation or cooperative.
5. Is in compliance with and, during the three-year period before submitting the verification, have not violated certain labor and wage laws.
6. Is in compliance with and, during the three-year period before submitting the verification, have not violated certain laws related to construction contractors, construction codes, and licensing.
7. Has not, more than twice during the three-year period before submitting the verification, had a certificate of compliance under Minnesota Statues, Section 363A.36 (related to affirmative action plans for the employment of minority persons, women, and qualified disabled individuals) revoked or suspended.
8. Has not received a final determination assessing a monetary sanction from the Department of Administration or Transportation for failure to meet targeted group business, disadvantaged business enterprise, or veteran-owned business goals, due to a lack of good faith effort, more than once during the three-year period before submitting this verification.
9. Is not currently suspended or debarred by the federal government or the State of Minnesota or any of its departments, commissions, agencies, or political subdivisions.
10. Has verified that all subcontractors that we intend to use to perform work on this project have verified to us through a signed statement under oath by an owner or officer that they meet the minimum criteria listed above.
11. Understands that any prime contractor or subcontractor that does not meet the minimum criteria in Minnesota Statutes, Section 16C.285, subdivision 3 or fails to verify that it meets those criteria is not a responsible contractor and is not eligible to be awarded the construction contract for the project or to perform work on this project.
12. Contractor shall submit to Owner, upon request copies of the signed verifications of compliance from all subcontractors of any tier pursuant to Minnesota Statues, Section 16C.285, subdivision 3, clause 7.

13. Understands that a false statement under oath verifying compliance with any of the minimum criteria shall render the prime contractor or subcontractor that makes the false statement ineligible to be awarded a construction contract on the project and may result in termination of a contract awarded to a prime contractor or subcontractor that submits a false statement.

The undersigned owner or officer, being first duly sworn on oath, swears the Bidder/Contractor is in compliance with this document and verifies that Bidder/Contractor is a Responsible Contractor as defined by Minnesota Statute Section 16C.285, subdivision 3.

NAME OF BIDDER/CONTRACTOR: _____ ____

AUTHORIZED SIGNATURE: _____ **DATE:** _____ ____

PRINTED NAME: _____ ___

TITLE: _____

ATTACHMENT A
SUBCONTRACTORS LIST
FIRE STATION NO. 2 - REMODEL

The following first-tier subcontractors are intended to be retained for work on this project. These subcontractors have verified to us through a signed statement under oath by an owner or officer that they meet the minimum criteria under Minnesota Statute Section 16C.285.

SUBCONTRACTORS NAME	NAME OF CITY WHERE SUBCONTRACTOR'S HOME OFFICE IS LOCATED

ATTACHMENT B
SUPPLEMENTAL SUBCONTRACTORS LIST
FIRE STATION NO. 2 - REMODEL

This form must be submitted to the Owner's Project Manager within 14 days of retaining additional subcontractors that were not included in Attachment A of Section 00 4114.

SUBCONTRACTORS NAME	NAME OF CITY WHERE SUBCONTRACTOR'S HOME OFFICE IS LOCATED

The undersigned owner or officer, being first duly sworn on oath, swears the additional subcontractors listed on this form have verified through a signed statement under oath by an owner or officer that they meet the minimum criteria under Minnesota Statute Section 16C.285.

NAME OF BIDDER/CONTRACTOR: _____ ____

AUTHORIZED SIGNATURE: _____ **DATE:** _____ ____

PRINTED NAME: _____ ___

TITLE: _____

END OF SECTION

SECTION 00 4313
BID SECURITY

Submit Bid Bond on AIA Document A310 (Current Edition) Bid Bond form.

END OF SECTION

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AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

BOND AMOUNT:

PROJECT:
(Name, location or address, and Project number, if any)

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of

(Witness)	*(Contractor as Principal)* *(Seal)*
	(Title)
(Witness)	*(Surety)* *(Seal)*
	(Title)

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

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Sample

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SECTION 00 4325
SUBSTITUTION REQUEST FORM - DURING PROCUREMENT

DATE: _____

To: WiDSETH: GRAND FORKS
3535 South 31st Street, Suite 203
Grand Forks, ND 58201
Phone: 701-795-1975
Email: Brent Dammann @ Brent.Dammann@widseth.com
Subject Line to include: "2025-10872 - EGF Fire Station #2 Remodel"

PROJECT: Fire Station No. 2 - Remodel

SPECIFIED ITEMS:

1. Section # & Title:_____
   a. Page:_____ _____
   b. Paragraph:_____ _____
   c. Description:_____ _____

The undersigned requests the approval of the following:

PROPOSED SUBSTITUTION(S):

1. Manufacturer: _____
2. City, State: _____
3. Model No.: _____

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of the request; **clearly identify** applicable portions of data.

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 that the following paragraphs, unless modified by attachments, are correct:

1. The proposed substitution does not affect dimensions shown on Drawings.
2. The undersigned will pay for changes to the building design, including engineering design, detailing, and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.

The undersigned further states that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified item.

Submitted by: _____ _____

1. Signature: _____
2. Firm: _____
3. Address:_____
4. Phone:_____
5. Fax:_____
6. Email: _____

Attachments:

1. _____
2. _____

END OF SECTION

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SECTION 00 5200
AGREEMENT FORM

Included in this Project Manual by reference is the Form of Agreement, AIA Document A101, Standard Form of Agreement Between Owner and Contractor, Current Edition.

END OF SECTION

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AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the _____ day of _____ in the year _____
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

The Architect:
(Name, legal status, address and other information)

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

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement.

AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

Sample

The Owner and Contractor agree as follows.

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TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

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 a Modification, 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 SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

☐ The date of this Agreement.

☐ A date set forth in a notice to proceed issued by the Owner.

☐ Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

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

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

☐ Not later than ( ) calendar days from the date of commencement of the Work.

Sample

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☐ By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, 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 ($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

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

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

Sample

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ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the 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, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than ( ) days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 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 Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 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.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 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.

§ 5.1.6.2 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 A201–2017;
- **.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 A201–2017; and
- **.5** Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Sample

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§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 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 Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

_____ % _____

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

Sample

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§ 6.2 Binding Dispute Resolution
For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2017

☐ Litigation in a court of competent jurisdiction

☐ Other *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION
§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS
§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 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:
(Name, address, email address, and other information)

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

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

Sample

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§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, 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 A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, 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:
(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 incorporated into this Agreement.)

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

☐ AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

Sample

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☐ The Sustainability Plan:

Title	Date	Pages

☐ Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

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

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

Sample

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SECTION 00 6113
PERFORMANCE AND PAYMENT BOND

Included in this Project Manual by reference is the form of bonds, AIA Document A312 (Current Edition), Performance Bond and Payment Bond.

END OF SECTION

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AIA® Document A312® – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:

Amount:

Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

Sample

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- **.1** have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- **.2** have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

Sample

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§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- **.1** the name of the Claimant;
- **.2** the name of the person for whom the labor was done, or materials or equipment furnished;
- **.3** a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- **.4** a brief description of the labor, materials or equipment furnished;
- **.5** the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- **.6** the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- **.7** the total amount of previous payments received by the Claimant; and
- **.8** the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

Sample

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§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

Sample

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address		Address	

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AIA® Document A312® – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:

Amount:

Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

Sample

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

Sample

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§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

Sample

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§ 16 Modifications to this bond are as follows:

Sample

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address		Address	

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SECTION 00 6213
CERTIFICATE OF INSURANCE

Certificate of Insurance shall be ACORD form, modified as indicated in the Supplementary General Conditions document. A sample copy is bound herein.

Provide limits and coverage as indicated in the 00 7300 - Supplementary General Conditions.

END OF SECTION

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SECTION 00 7200
GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS

AIA DOCUMENT A201, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CURRENT EDITION, ATTACHED, IS THE GENERAL CONDITIONS

SUPPLEMENTARY CONDITIONS

REFER TO DOCUMENT 00 7300 - SUPPLEMENTARY CONDITIONS FOR AMENDMENTS TO THESE GENERAL CONDITIONS.

END OF SECTION

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AIA® Document A201® – 2017

General Conditions of the Contract for Construction

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

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

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.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 OWNER

3 CONTRACTOR

4 ARCHITECT

5 SUBCONTRACTORS

6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

7 CHANGES IN THE WORK

8 TIME

9 PAYMENTS AND COMPLETION

10 PROTECTION OF PERSONS AND PROPERTY

11 INSURANCE AND BONDS

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

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INDEX
(Topics and numbers in bold are Section headings.)

Acceptance of Nonconforming Work
9.6.6, 9.9.3, **12.3**
Acceptance of Work
9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3
Access to Work
3.16, 6.2.1, 12.1
Accident Prevention
10
Acts and Omissions
3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5, 10.2.8, 13.3.2, 14.1, 15.1.2, 15.2
Addenda
1.1.1
Additional Costs, Claims for
3.7.4, 3.7.5, 10.3.2, 15.1.5
Additional Inspections and Testing
9.4.2, 9.8.3, 12.2.1, **13.4**
Additional Time, Claims for
3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.6**
Administration of the Contract
3.1.3, **4.2**, 9.4, 9.5
Advertisement or Invitation to Bid
1.1.1
Aesthetic Effect
4.2.13
Allowances
3.8
Applications for Payment
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10
Approvals
2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9, 3.12.10.1, 4.2.7, 9.3.2, 13.4.1
Arbitration
8.3.1, 15.3.2, **15.4**
ARCHITECT
4
Architect, Definition of
4.1.1
Architect, Extent of Authority
2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2, 9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1, 13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1
Architect, Limitations of Authority and Responsibility
2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2, 9.5.4, 9.6.4, 15.1.4, 15.2
Architect's Additional Services and Expenses
2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4
Architect's Administration of the Contract
3.1.3, 3.7.4, 15.2, 9.4.1, 9.5
Architect's Approvals
2.5, 3.1.3, 3.5, 3.10.2, 4.2.7
Architect's Authority to Reject Work
3.5, 4.2.6, 12.1.2, 12.2.1
Architect's Copyright
1.1.7, 1.5
Architect's Decisions
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1, 13.4.2, 15.2
Architect's Inspections
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4
Architect's Instructions
3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2
Architect's Interpretations
4.2.11, 4.2.12
Architect's Project Representative
4.2.10
Architect's Relationship with Contractor
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2
Architect's Relationship with Subcontractors
1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3
Architect's Representations
9.4.2, 9.5.1, 9.10.1
Architect's Site Visits
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4
Asbestos
10.3.1
Attorneys' Fees
3.18.1, 9.6.8, 9.10.2, 10.3.3
Award of Separate Contracts
6.1.1, 6.1.2
Award of Subcontracts and Other Contracts for Portions of the Work
5.2
Basic Definitions
1.1
Bidding Requirements
1.1.1
Binding Dispute Resolution
8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1
Bonds, Lien
7.3.4.4, 9.6.8, 9.10.2, 9.10.3
Bonds, Performance, and Payment
7.3.4.4, 9.6.7, 9.10.3, **11.1.2**, 11.1.3, **11.5**
Building Information Models Use and Reliance
1.8
Building Permit
3.7.1
Capitalization
1.3
Certificate of Substantial Completion
9.8.3, 9.8.4, 9.8.5

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Certificates for Payment
4.2.1, 4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4
Certificates of Inspection, Testing or Approval
13.4.4
Certificates of Insurance
9.10.2
Change Orders
1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3, 7.1.2, 7.1.3, **7.2**, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2
Change Orders, Definition of
7.2.1
CHANGES IN THE WORK
2.2.2, 3.11, 4.2.8, **7**, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1, 11.5
Claims, Definition of
15.1.1
Claims, Notice of
1.6.2, 15.1.3
CLAIMS AND DISPUTES
3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, **15**, 15.4
Claims and Timely Assertion of Claims
15.4.1
Claims for Additional Cost
3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, **15.1.5**
Claims for Additional Time
3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, **15.1.6**
Concealed or Unknown Conditions, Claims for
3.7.4
Claims for Damages
3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3, 11.3.2, 14.2.4, 15.1.7
Claims Subject to Arbitration
15.4.1
Cleaning Up
3.15, 6.3
Commencement of the Work, Conditions Relating to
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3, 6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, **15.1.5**
Commencement of the Work, Definition of
8.1.2
Communications
3.9.1, **4.2.4**
Completion, Conditions Relating to
3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1, 9.10, 12.2, 14.1.2, 15.1.2
COMPLETION, PAYMENTS AND
9
Completion, Substantial
3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 15.1.2
Compliance with Laws
2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3, 15.2.8, 15.4.2, 15.4.3
Concealed or Unknown Conditions
3.7.4, 4.2.8, 8.3.1, 10.3
Conditions of the Contract
1.1.1, 6.1.1, 6.1.4
Consent, Written
3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2, 15.4.4.2
Consolidation or Joinder
15.4.4
CONSTRUCTION BY OWNER OR BY
SEPARATE CONTRACTORS
1.1.4, **6**
Construction Change Directive, Definition of
7.3.1
Construction Change Directives
1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, **7.3**, 9.3.1.1
Construction Schedules, Contractor's
3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2
Contingent Assignment of Subcontracts
5.4, 14.2.2.2
Continuing Contract Performance
15.1.4
Contract, Definition of
1.1.2
CONTRACT, TERMINATION OR
SUSPENSION OF THE
5.4.1.1, 5.4.2, 11.5, **14**
Contract Administration
3.1.3, 4, 9.4, 9.5
Contract Award and Execution, Conditions Relating to
3.7.1, 3.10, 5.2, 6.1
Contract Documents, Copies Furnished and Use of
1.5.2, 2.3.6, 5.3
Contract Documents, Definition of
1.1.1
Contract Sum
2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4, **9.1**, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2, 12.3, 14.2.4, 14.3.2, 15.1.4.2, **15.1.5, 15.2.5**
Contract Sum, Definition of
9.1
Contract Time
1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5, 7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1, 8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2, 14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5
Contract Time, Definition of
8.1.1
CONTRACTOR
3
Contractor, Definition of
3.1, 6.1.2
Contractor's Construction and Submittal
Schedules
3.10, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2

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Contractor's Employees
2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.3, 14.1, 14.2.1.1
Contractor's Liability Insurance
11.1
Contractor's Relationship with Separate Contractors and Owner's Forces
3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4
Contractor's Relationship with Subcontractors
1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2, 9.6.7, 9.10.2, 11.2, 11.3, 11.4
Contractor's Relationship with the Architect
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1
Contractor's Representations
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2
Contractor's Responsibility for Those Performing the Work
3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8
Contractor's Review of Contract Documents
3.2
Contractor's Right to Stop the Work
2.2.2, 9.7
Contractor's Right to Terminate the Contract
14.1
Contractor's Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3
Contractor's Superintendent
3.9, 10.2.6
Contractor's Supervision and Construction Procedures
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4
Coordination and Correlation
1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1
Copies Furnished of Drawings and Specifications
1.5, 2.3.6, 3.11
Copyrights
1.5, **3.17**
Correction of Work
2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**, 12.3, 15.1.3.1, 15.1.3.2, 15.2.1
Correlation and Intent of the Contract Documents
1.2
Cost, Definition of
7.3.4
Costs
2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14
Cutting and Patching
3.14, 6.2.5
Damage to Construction of Owner or Separate Contractors
3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4
Damage to the Work
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4
Damages, Claims for
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2, 11.3, 14.2.4, 15.1.7
Damages for Delay
6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2
Date of Commencement of the Work, Definition of
8.1.2
Date of Substantial Completion, Definition of
8.1.3
Day, Definition of
8.1.4
Decisions of the Architect
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2, 14.2.2, 14.2.4, 15.1, 15.2
Decisions to Withhold Certification
9.4.1, **9.5**, 9.7, 14.1.1.3
Defective or Nonconforming Work, Acceptance, Rejection and Correction of
2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1
Definitions
1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1
Delays and Extensions of Time
3.2, **3.7.4**, 5.2.3, 7.2.1, 7.3.1, **7.4**, **8.3**, 9.5.1, **9.7**, 10.3.2, **10.4**, 14.3.2, **15.1.6**, 15.2.5
Digital Data Use and Transmission
1.7
Disputes
6.3, 7.3.9, 15.1, 15.2
Documents and Samples at the Site
3.11
Drawings, Definition of
1.1.5
Drawings and Specifications, Use and Ownership of
3.11
Effective Date of Insurance
8.2.2
Emergencies
10.4, 14.1.1.2, **15.1.5**
Employees, Contractor's
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.3, 14.1, 14.2.1.1
Equipment, Labor, or Materials
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Execution and Progress of the Work
1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4

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Extensions of Time
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.6, **15.2.5**
Failure of Payment
9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2
Faulty Work
(See Defective or Nonconforming Work)
Final Completion and Final Payment
4.2.1, 4.2.9, 9.8.2, **9.10**, 12.3, 14.2.4, 14.4.3
Financial Arrangements, Owner's
2.2.1, 13.2.2, 14.1.1.4
GENERAL PROVISIONS
1
Governing Law
13.1
Guarantees (See Warranty)
Hazardous Materials and Substances
10.2.4, **10.3**
Identification of Subcontractors and Suppliers
5.2.1
Indemnification
3.17, **3.18**, 9.6.8, 9.10.2, 10.3.3, 11.3
Information and Services Required of the Owner
2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5, 9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4
Initial Decision
15.2
Initial Decision Maker, Definition of
1.1.8
Initial Decision Maker, Decisions
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Initial Decision Maker, Extent of Authority
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Injury or Damage to Person or Property
10.2.8, 10.4
Inspections
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 12.2.1, 13.4
Instructions to Bidders
1.1.1
Instructions to the Contractor
3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2
Instruments of Service, Definition of
1.1.7
Insurance
6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5, **11**
Insurance, Notice of Cancellation or Expiration
11.1.4, 11.2.3
Insurance, Contractor's Liability
11.1
Insurance, Effective Date of
8.2.2, 14.4.2
Insurance, Owner's Liability
11.2
Insurance, Property
10.2.5, 11.2, 11.4, 11.5
Insurance, Stored Materials
9.3.2
INSURANCE AND BONDS
11
Insurance Companies, Consent to Partial Occupancy
9.9.1
Insured loss, Adjustment and Settlement of
11.5
Intent of the Contract Documents
1.2.1, 4.2.7, 4.2.12, 4.2.13
Interest
13.5
Interpretation
1.1.8, 1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1
Interpretations, Written
4.2.11, 4.2.12
Judgment on Final Award
15.4.2
Labor and Materials, Equipment
1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Labor Disputes
8.3.1
Laws and Regulations
1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8, 15.4
Liens
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8
Limitations, Statutes of
12.2.5, 15.1.2, 15.4.1.1
Limitations of Liability
3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6, 4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3, 11.3, 12.2.5, 13.3.1
Limitations of Time
2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7, 5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15, 15.1.2, 15.1.3, 15.1.5
Materials, Hazardous
10.2.4, **10.3**
Materials, Labor, Equipment and
1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2
Means, Methods, Techniques, Sequences and Procedures of Construction
3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2
Mechanic's Lien
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8
Mediation
8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1, 15.4.1.1
Minor Changes in the Work
1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, **7.4**

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MISCELLANEOUS PROVISIONS
13
Modifications, Definition of
1.1.1
Modifications to the Contract
1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2
Mutual Responsibility
6.2
Nonconforming Work, Acceptance of
9.6.6, 9.9.3, **12.3**
Nonconforming Work, Rejection and Correction of
2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2
Notice
1.6, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4, 3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4, 8.2.2 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1, 13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5, 15.1.6, 15.4.1
Notice of Cancellation or Expiration of Insurance
11.1.4, 11.2.3
Notice of Claims
1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, **15.1.3**, 15.1.5, 15.1.6, 15.2.8, 15.3.2, 15.4.1
Notice of Testing and Inspections
13.4.1, 13.4.2
Observations, Contractor's
3.2, 3.7.4
Occupancy
2.3.1, 9.6.6, 9.8
Orders, Written
1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2, 14.3.1
OWNER
2
Owner, Definition of
2.1.1
Owner, Evidence of Financial Arrangements
2.2, 13.2.2, 14.1.1.4
Owner, Information and Services Required of the
2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4
Owner's Authority
1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4, 15.2.7
Owner's Insurance
11.2
Owner's Relationship with Subcontractors
1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2
Owner's Right to Carry Out the Work
2.5, 14.2.2
Owner's Right to Clean Up
6.3
Owner's Right to Perform Construction and to Award Separate Contracts
6.1
Owner's Right to Stop the Work
2.4
Owner's Right to Suspend the Work
14.3
Owner's Right to Terminate the Contract
14.2, 14.4
Ownership and Use of Drawings, Specifications and Other Instruments of Service
1.1.1, 1.1.6, 1.1.7, **1.5**, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12, 5.3
Partial Occupancy or Use
9.6.6, **9.9**
Patching, Cutting and
3.14, 6.2.5
Patents
3.17
Payment, Applications for
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3
Payment, Certificates for
4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4
Payment, Failure of
9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2
Payment, Final
4.2.1, 4.2.9, **9.10**, 12.3, 14.2.4, 14.4.3
Payment Bond, Performance Bond and
7.3.4.4, 9.6.7, 9.10.3, **11.1.2**
Payments, Progress
9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4
PAYMENTS AND COMPLETION
9
Payments to Subcontractors
5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2
PCB
10.3.1
Performance Bond and Payment Bond
7.3.4.4, 9.6.7, 9.10.3, **11.1.2**
Permits, Fees, Notices and Compliance with Laws
2.3.1, **3.7**, 3.13, 7.3.4.4, 10.2.2
PERSONS AND PROPERTY, PROTECTION OF
10
Polychlorinated Biphenyl
10.3.1
Product Data, Definition of
3.12.2
Product Data and Samples, Shop Drawings
3.11, **3.12**, 4.2.7
Progress and Completion
4.2.2, **8.2**, 9.8, 9.9.1, 14.1.4, 15.1.4
Progress Payments
9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4

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User Notes:

Project, Definition of
1.1.4
Project Representatives
4.2.10
Property Insurance
10.2.5, **11.2**
Proposal Requirements
1.1.1
PROTECTION OF PERSONS AND PROPERTY
10
Regulations and Laws
1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8, 15.4
Rejection of Work
4.2.6, 12.2.1
Releases and Waivers of Liens
9.3.1, 9.10.2
Representations
3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1
Representatives
2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1
Responsibility for Those Performing the Work
3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10
Retainage
9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3
Review of Contract Documents and Field Conditions by Contractor
3.2, 3.12.7, 6.1.3
Review of Contractor's Submittals by Owner and Architect
3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2
Review of Shop Drawings, Product Data and Samples by Contractor
3.12
Rights and Remedies
1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1, 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2, 12.2.4, **13.3**, 14, 15.4
Royalties, Patents and Copyrights
3.17
Rules and Notices for Arbitration
15.4.1
Safety of Persons and Property
10.2, 10.4
Safety Precautions and Programs
3.3.1, 4.2.2, 4.2.7, 5.3, **10.1**, 10.2, 10.4
Samples, Definition of
3.12.3
Samples, Shop Drawings, Product Data and
3.11, **3.12**, 4.2.7
Samples at the Site, Documents and
3.11
Schedule of Values
9.2, 9.3.1
Schedules, Construction
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2
Separate Contracts and Contractors
1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2
Separate Contractors, Definition of
6.1.1
Shop Drawings, Definition of
3.12.1
Shop Drawings, Product Data and Samples
3.11, **3.12**, 4.2.7
Site, Use of
3.13, 6.1.1, 6.2.1
Site Inspections
3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4
Site Visits, Architect's
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4
Special Inspections and Testing
4.2.6, 12.2.1, 13.4
Specifications, Definition of
1.1.6
Specifications
1.1.1, **1.1.6**, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14
Statute of Limitations
15.1.2, 15.4.1.1
Stopping the Work
2.2.2, 2.4, 9.7, 10.3, 14.1
Stored Materials
6.2.1, 9.3.2, 10.2.1.2, 10.2.4
Subcontractor, Definition of
5.1.1
SUBCONTRACTORS
5
Subcontractors, Work by
1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7
Subcontractual Relations
5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1
Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3
Submittal Schedule
3.10.2, 3.12.5, 4.2.7
Subrogation, Waivers of
6.1.1, **11.3**
Substances, Hazardous
10.3
Substantial Completion
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, **9.8**, 9.9.1, 9.10.3, 12.2, 15.1.2
Substantial Completion, Definition of
9.8.1
Substitution of Subcontractors
5.2.3, 5.2.4
Substitution of Architect
2.3.3
Substitutions of Materials
3.4.2, 3.5, 7.3.8
Sub-subcontractor, Definition of
5.1.2

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User Notes:

Subsurface Conditions
3.7.4
Successors and Assigns
13.2
Superintendent
3.9, 10.2.6
Supervision and Construction Procedures
1.2.2, **3.3**, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4
Suppliers
1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6, 9.10.5, 14.2.1
Surety
5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2, 15.2.7
Surety, Consent of
9.8.5, 9.10.2, 9.10.3
Surveys
1.1.7, 2.3.4
Suspension by the Owner for Convenience
14.3
Suspension of the Work
3.7.5, 5.4.2, 14.3
Suspension or Termination of the Contract
5.4.1.1, 14
Taxes
3.6, 3.8.2.1, 7.3.4.4
Termination by the Contractor
14.1, 15.1.7
Termination by the Owner for Cause
5.4.1.1, **14.2,** 15.1.7
Termination by the Owner for Convenience
14.4
Termination of the Architect
2.3.3
Termination of the Contractor Employment
14.2.2

TERMINATION OR SUSPENSION OF THE CONTRACT
14
Tests and Inspections
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, **13.4**
TIME
8
Time, Delays and Extensions of
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5
Time Limits
2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15.1.2, 15.1.3, 15.4
Time Limits on Claims
3.7.4, 10.2.8, 15.1.2, 15.1.3
Title to Work
9.3.2, 9.3.3
UNCOVERING AND CORRECTION OF WORK
12
Uncovering of Work
12.1
Unforeseen Conditions, Concealed or Unknown
3.7.4, 8.3.1, 10.3
Unit Prices
7.3.3.2, 9.1.2
Use of Documents
1.1.1, 1.5, 2.3.6, 3.12.6, 5.3
Use of Site
3.13, 6.1.1, 6.2.1
Values, Schedule of
9.2, 9.3.1
Waiver of Claims by the Architect
13.3.2
Waiver of Claims by the Contractor
9.10.5, 13.3.2, **15.1.7**
Waiver of Claims by the Owner
9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, **15.1.7**
Waiver of Consequential Damages
14.2.4, 15.1.7
Waiver of Liens
9.3, 9.10.2, 9.10.4
Waivers of Subrogation
6.1.1, **11.3**
Warranty
3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2, 15.1.2
Weather Delays
8.3, 15.1.6.2
Work, Definition of
1.1.3
Written Consent
1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3, 13.2, 13.3.2, 15.4.4.2
Written Interpretations
4.2.11, 4.2.12
Written Orders
1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

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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 a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's 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 the Owner and by Separate Contractors.

§ 1.1.5 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.

§ 1.1.6 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.

§ 1.1.7 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.

§ 1.1.8 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.

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§ 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 written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

§ 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 written protocols governing the use of, and reliance on, the information contained in the model 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.

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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 Architect does 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.

§ 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 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

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§ 2.3.4 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.

§ 2.3.5 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.

§ 2.3.6 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.

§ 2.4 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 prior approval of the Architect and the 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 Architect's 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 Architect in the Architect's 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 2.3.4, 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

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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 Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the 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 Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the 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 and 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. Unless the Architect 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 Work 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 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.

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§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner 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 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 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 Contractor shall secure and pay for the building permit as well as 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 and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect 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 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 and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that 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 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.

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§ 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 of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect 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 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 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.

§ 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 Architect's approval. The Architect'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 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 perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 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 Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

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§ 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 is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is 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 Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner 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 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 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 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,

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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 and the Architect 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.

§ 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 Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

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.

§ 3.14 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 or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, 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 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 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 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 or Architect. 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.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, 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,

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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

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

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The 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. The 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.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor 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 Contractor 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 Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the

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Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 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. Review of such submittals 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 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 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.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 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 Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

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

§ 4.2.12 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 rendered in good faith.

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

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests 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 a Separate Contractor or the subcontractors of a Separate Contractor.

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§ 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 Owner 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 Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect 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 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 or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner 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 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 and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner 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.

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§ 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 and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. 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 separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 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 and Separate 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 or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify 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 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 Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor 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 a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 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 or Separate Contractor as provided in Section 10.2.5.

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

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§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate 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 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, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner 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

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect 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 Architect and signed by the Owner 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 Architect 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 Architect 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 Architect;
- **.2** Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

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.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 Architect 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 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 Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's 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 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 Architect will 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 Architect 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 Architect 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.

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§ 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 or Architect, of an employee of either, or of a Separate Contractor; (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 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 Architect 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 Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by 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 ten days before the date established for each progress payment, the Contractor shall submit to the Architect 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 or Architect require, such as copies of requisitions, and releases and waivers of liens 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 Architect, but not yet included in Change Orders.

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§ 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 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor 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 Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, 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 entitled to payment in the amount certified. The foregoing representations 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 Architect. However, the issuance of a Certificate for Payment will not be a representation that the 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 Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The 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 previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from 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;

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.5 damage to the Owner or a Separate 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 withholds certification for payment under Section 9.5.1.3, 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 Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a 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 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 Architect 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 Architect and Owner 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 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.

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§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after 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 Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner 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 that 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 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 Contractor's list, the Architect 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 Contractor's 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 to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare 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 shall 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.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, 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.

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§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's 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 Architect's final 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 (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 Architect so confirms, the Owner shall, upon application by the Contractor and certification by the 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 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.

§ 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;

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.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; and

.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.

§ 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 and 10.2.1.3 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 and 10.2.1.3. 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 or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to 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 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 and Substances

§ 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 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 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 and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities

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proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor 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, Architect, 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 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, 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 to the Owner 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

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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 the Contractor 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 to the Contractor 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 Architect and Architect's consultants; and (3) 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 Architect, Architect's consultants, 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

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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 and Architect 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 Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the 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 Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's 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 Architect has not specifically requested to examine prior to its being covered, the 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 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 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 or Architect, the Owner may correct it in accordance with Section 2.5.

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§ 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 or Separate 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, 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

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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 Architect timely notice of when and where tests and inspections are to be made so that the 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 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 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 Architect of when and where tests and inspections are to be made so that the 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 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 Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the 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 Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, 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 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.

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§ 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 or entities 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 and the 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, 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 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 be certified by the Initial Decision Maker, upon application, 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 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 the 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.

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§ 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 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.

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§ 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 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 after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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§ 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.

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§ 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.

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Additions and Deletions Report for

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SECTION 00 7300
SUPPLEMENTARY CONDITIONS

PART 1 GENERAL

SUMMARY

A. These Supplementary Conditions amend and supplement the General Conditions defined in Document 00 7200 - General Conditions and other provisions of Contract Documents as indicated below. Provisions that are not so amended or supplemented remain in full force and effect.

B. The terms used in these Supplementary Conditions that are defined in the General Conditions have the meanings assigned to them in the General Conditions.

ARTICLE 1: GENERAL PROVISIONS

SECTION 1.1 BASIC DEFINITIONS

A. Delete the last sentence of Paragraph 1.1.1 and substitute the following: "The Contract Documents include all Documents which are a part of, and all forms required or specified in, this Project Manual."

SECTION 1.4 INTERPRETATION

A. Add the following Paragraph 1.4.1.:

"1.4.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

a. The Agreement.
b. Change Orders and Supplemental Instructions
c. Addenda, with those of later date having precedence over those of earlier date.
d. Supplementary Conditions.
e. General Conditions of the Contract for Construction
f. Drawings and Specifications
g. In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation."

ARTICLE 2: OWNER

SECTION 2.3 INFORMATION AND SERVICES REQUIRED OF THE OWNER

A. Add the following Paragraph 2.3.7:

"2.3.7 Plans and Specifications are subject to the approval of certain state agencies (i.e., State Building Codes Division, etc.) Contractor is advised that approvals may occur after receipt of bids. Approval and Notice of Contract Award is subject to final approval of state agencies."

ARTICLE 3: CONTRACTOR

SECTION 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

A. Add the following Paragraph 3.3.4:

"3.3.4 The Contractor and authorized representatives shall attend all meetings as requested and scheduled by the Architect."

SECTION 3.15 CLEANING UP

A. Add to the first sentence of Paragraph 3.15.1 the following:

"...including broom cleaning of the floor. All packing/crating materials from goods installed will be removed from the site by the Contractor responsible for the packaged materials. The Contractor responsible for taking delivery of Owner furnished materials will be responsible for packing/crating of goods delivered."

B. Add the following Paragraph 3.15.3:

"3.15.3 All matter (snow, water, dirt or other debris) accumulated in a designated work area are the responsibility of the Contractor to remove."

ARTICLE 4: ARCHITECT

SECTION 4.2 ADMINISTRATION OF THE CONTRACT

A. Add the following to Paragraph 4.2.4:

"Direct communications between the Architect and the Contractor that affect the performance or administration of the Work shall be made or confirmed in writing."

ARTICLE 7: CHANGES IN THE WORK

SECTION 7.1 GENERAL

A. Add the following paragraph 7.1.4 - Allowance for Overhead and Profit.

Changes in work of any type may include an allowance for the combined overhead and profit in the total cost to the Owner but may not exceed the amount identified in the following schedule:

.1 Contractors and Subcontractors may add up to 10% of the direct cost of their own labor.

.2 Contractors and Subcontractors may add up to 5% of the direct cost of materials and equipment.

.3 Contractors and Subcontractors may add up to 5% of the cost of Subcontractors and Sub-Subcontractors.

.4 Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.4.

.5 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are subcontracts, they shall be itemized by the Subcontractor completing the changed scope of work. In no case will a change involving over $1,500.00 be approved without such itemization.

ARTICLE 8: TIME

SECTION 8.3 DELAYS AND EXTENSIONS OF TIME

A. Revise Paragraph 8.3.1 as follows:

"...pending mediation and arbitration, or litigation, as provided for herein, or by other causes..."

B. Add the following Paragraph 8.3.4 as follows:

"8.3.4 Owner owns all float in the Contract Time. Contractor shall not receive compensation for any claims relating to float."

C. Add the following Paragraph 8.3.5 as follows:

"8.3.5 Upon receipt of Notice to Proceed, the Contractor shall begin construction operations and continuously and effectively prosecute the work with the least possible delay, so as to complete all contract work and all cleanup within the contract time, taking into consideration all restrictions or limitations to construction procedures hereinafter specified."

D. Add the following Paragraph 8.3.6 as follows:

"8.3.6 The Contractor shall be responsible for damages incurred by the Owner and separate Contractors for delay resulting from the Contractor's failure to complete the work within the Contract time indicated in the Agreement. Losses may include additional administrative costs, rental costs for required off-site space, additional custodial costs and professional fees."

ARTICLE 9: PAYMENTS AND COMPLETION

SECTION 9.3 APPLICATIONS FOR PAYMENT

A. Delete Paragraph 9.3.1, and Subparagraph 9.3.1.1 and Substitute the following:

"9.3.1 Contractor shall submit Schedule of Values to the Architect for approval within five (5) days after receipt of the Contract. Parts of the Work shall be broken down into labor, material, and equipment with no line item total greater than $75,000. Once approved the schedule of values will be used on subsequent applications through the end of the project."

"9.3.1.1 Applications shall be electronically submitted to the Architect by the twenty-fifth of each month. Application will include all items incorporated into the project or stored (in a secure manner) on-site. This also includes updating of record drawings on a monthly basis. Applications will not be processed for the month until record documents are updated."

"9.3.1.3 Applications and schedule of values will be submitted on AIA forms G702-1992, and G703-1992."

"9.3.1.5 Retention is the Owner's assurance that work is functional upon completion. Retention will not be used to account for costs associated with "Punch List or Deficiency List" items. Listed items depict work not complete thus not accountable on the application for payment."

"9.3.1.6 The Owner, in making partial payments, will retain five (5) percent of the duly approved value of the work performed under the contract as of the date of the application for payment until final completion and acceptance of all work covered by the Contract. The Contractor will not be paid interest on retainage amount."

"9.3.1.7 The Contractor may, at his option, deposit bonds or securities with the Owner or in any bank or trust company to be held in lieu of cash retainage for the benefit of the Owner. In that event, the Owner shall reduce the retainage in an amount equal to the value of the bonds and securities and pay the amount of the reduction to the Contractor.

a. Interest on the bonds or securities shall be payable to the Contractor as it accrues. Bonds and securities deposited or acquired in lieu of retainage shall be of a character approved by the Owner including, but not limited to:
    1) Bills, certificates, notes or bonds of the United States;
    2) Other obligations of the United States or its agencies;
    3) Obligations of any corporation wholly owned by the Federal Government; or
    4) Indebtedness of the Federal National Mortgage Association.
b. If the Owner incurs additional costs as a result of the exercise of the option described above, the Owner may recover the costs from the Contractor by reducing the final payment due under the Contract. As work on the Contract progresses, the Owner shall, upon demand, inform the Contractor of all accrued costs."

"9.3.1.8 The Contractor will submit a maximum of one (1) request for payment application per month."

"9.3.1.9 A progress payment shall not be considered acceptance or approval of any work or waiver of any defect therein."

"9.3.1.10 All applications will have attached conditional lien waivers for that application for payment."

SECTION 9.7 FAILURE OF PAYMENT

A. Revise paragraph 9.7 as follows:

... within fifteen (15) days after the receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor with thirty (30) days ...

B. Add the following subparagraph 9.7.1:

Work is to commence promptly upon payment from Owner.

SECTION 9.8 SUBSTANTIAL COMPLETION

A. Add the following to Paragraph 9.8.1:

"If the Work or portion thereof is to be followed by construction by the Owner or by the separate Contractors, Substantial Completion shall be defined as the readiness of the Work for the commencement of such construction:"

B. Add the following Subparagraph 9.8.2.1:

"9.8.2.1 The punchlist created with and attached to the Certificate of Substantial Completion will start a thirty (30) day completion timer. Within 5 days of receipt of the Certificate of Substantial Completion, Contractor will submit a punchlist completion schedule. Any items not completed within the thirty (30) day period will be remedied by other sources and the costs deducted from the Contractor's final application for payment. These deducted costs will include costs incurred by the Architect and Owner associated with rectifying the listed items. All warranties and closeout documentation must be complete, submitted and approved by the Architect prior to the Certificate of Substantial Completion being released."

ARTICLE 11: INSURANCE AND BONDS

SECTION 11.1 CONTRACTOR'S LIABILITY INSURANCE

A. Add the following to Subparagraph 11.1.1.8:

"Liability Insurance shall include all major divisions of coverage and be on a comprehensive basis including:

a. General Liability Insurance for Bodily Injury and Property Damage.
b. Products and Completed Operations.
c. Personal Injury and Employee Benefits Injury.
d. Owner, non-owned and hired motor vehicles.
e. Umbrella/Excess Liability.

B. Add the following to Paragraph 11.1.2:

"11.1.2.1 The insurance required by Subparagraph 11.1.1 shall be written for not less than the following, or greater if required by law:

1) Worker's Compensation:
   (a) State: Statutory
   (b) Federal:
   (e.g. Longshoreman's Statutory
   (c) Employer's Liability
      (1) Bodily Injury by Accident $100,000.00
      (2) Bodily Injury by Disease Policy Limit $500,000.00
      (3) Bodily Injury by Disease - Each Employee $100,000.00

2) Comprehensive General Liability written on an occurrence basis (including Premises-Operations; Independent Contractor's protective; Products and Completed Operations; Broad Form Property Damage):
   (a) General Aggregate $2,000,000.00
   (b) Products/Completed Operations Aggregate $2,000,000.00
   (c) Personal Injury & Advertising Injury $1,000,000.00
   (d) Each Occurrence $1,000,000.00
   (e) Fire Damage Limit $50,000.00
   (f) Medical Payment $5,000.00

   Property Damage Liability insurance will provide explosion, collapse and underground coverages where applicable.

3) Contractual Liability:
   (a) General Aggregate $3,000,000.00
   (b) Products/Completed Operations Aggregate $1,000,000.00
   (c) Personal Injury & Advertising Injury $1,000,000.00
   (d) Each Occurrence $1,000,000.00
   (e) Fire Damage Limit $50,000.00
   (f) Medical Payment $5,000.00

4) Personal Injury
   (a) Each Occurrence $1,000,000.00

5) Comprehensive Automobile Liability
   (a) Combined Single Limit $1,000,000.00
6) Commercial Umbrella
   (a) Minimum Limit $2,500,000.00
   (b) An Umbrella Liability policy may be used in conjunction with primary coverage limits to meet the minimum limit requirements for this project.

C. Delete 11.1.3 in its entirety and replace with:
"Certificates of insurance acceptable to the Owner shall be submitted to the Architect for Transmittal to the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Paragraph 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness. The Contractor shall provide written notification to the Owner of the cancelation or expiration of any insurance required by Section 11.1. The Contractor shall provide such written notice within five (5) business days of the date the Contractor is first aware of the cancelation or expiration, or is first aware that the cancelation or expiration is threatened or otherwise may occur, whichever comes first."

D. Add the following Subparagraph 11.1.3.2:
" The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.2 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

E. Add the following Subparagraph 11.1.3.3:
"Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss."

F. Add the following subparagraph 11.1.3.4:
"If the property insurance requires deductibles, the Contractor shall pay costs not covered because of such deductibles."

G. Add the following subparagraph 11.1.3.5:
"This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit."

SECTION 11.2 OWNER'S INSURANCE

A. Add the following to Paragraph 11.2.1:

"The Contractor shall purchase and maintain insurance covering the Owner's contingent liability for claims which may arise from operations under the Contract. The policy shall not be less than $1,000,000."

SECTION 11.3 PROPERTY INSURANCE

A. Add the following subparagraph 11.2.1.5
   1. "This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit."

ARTICLE 13: MISCELLANEOUS PROVISIONS

SECTION 13.6 OUT OF STATE CONTRACTOR

A. Add the following Paragraph 13.6.1:
   "13.6.1 Out-of-State Contractor with contract greater than $100,000 shall file a Form SD-E (Exemption from Surety Deposits for Out-of-State Contractors with the Minnesota Department of Revenue. If no exemption is given nine (9) percent of each application for payment will be withheld as surety and deposited with the Department of Revenue."

ARTICLE 15: CLAIMS AND DISPUTES

SECTION 15.4 ARBITRATION

A. Add the following to Subparagraph 15.4.1:
   "NOTE: All references to "Arbitration" in Section 15.4 shall be considered permissive and not mandatory. The Owner Shall, in its sole discretion, have the right and option to enforce any claim it may have against the Contractor, or against any of the Subcontractors, the Sub-subcontractors, Suppliers, or Vendors of Contractor, through litigation. The Owner shall, in its sole discretion, also have the right and option to refuse to arbitrate any claim brought against the Owner by the Contractor, either on the Contractor's own behalf, or on behalf of any of the Subcontractors, the Sub-subcontractors, Suppliers, or Vendors of Contractor and demand that such claim be pursued through litigation. In the event the Owner exercises its right and option to refuse to arbitrate a claim brought against the Owner, written notice of such refusal shall be given by Owner to the party making the claim and to any tribunal administrating the claim at any time up to and including the date when the Owner is required by any applicable statute, rule or order to respond to such claim."

B. Add the following Subparagraph 15.4.1.1.1:
   "15.4.1.1.1 A demand for arbitration shall be made within the time limits specified in Paragraphs 15.4.1.1, and in other cases within a reasonable time after Claim has arisen, and in no event shall it be made after ninety (90) days from the date of dispute. If not requested within the ninety (90) days, the Contractor's dispute shall be deemed waived and barred for all time."

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 00 9110
ADDENDA

The Architect may prepare and issue Addenda during the bidding period as necessary to interpret or clarify the bidding documents, to list approved substitutions of materials or systems or to change the date or time for receipt of bids.

Addenda will refer bidders to the affected drawings or section of the Project Manual and describe the modification, clarification or correction in writing or by means of supplemental drawings, if necessary.

Addenda will be serially numbered and dated, will identify Project, Owner and Architect and will reiterate the date and time of bid opening or state new date and time of bid opening, if changed.

Addenda will be distributed via QuestCDN to all known bidders at the address furnished by them when bidding documents were obtained.

Bidders shall not rely on oral instructions or representations made to bidders by any officer, agent or employee of the Owner or WiDSETH (Architect) and its consultants.

Clarifications requested by bidders must be made in writing not less than 7 days before date set for receipt of bids. The reply will be made in the form of an addenda, a copy of which will be forwarded to known planholders.

END OF SECTION

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DIVISION 01



GENERAL REQUIREMENTS

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SECTION 01 1000
SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: 2025-10872 - EGF Fire Station #2 Remodel

B. Owner's Name: City of East Grand Forks.
   1. Owner's Representative: Jeff Boushee, Fire Chief.

C. Architect's Name: WiDSETH.
   1. Architect's Representative: Brent Dammann.

D. The Project consists of the alteration of Fire Station #2. Work includes the construction of new bunk rooms, remodeling the kitchen and restroom. Work to include but not limited to selective demolition, masonry, doors and windows, reroofing, mechanical, plumbing and electrical.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 5200 - Agreement Form.

1.03 DESCRIPTION OF ALTERATIONS WORK

A. Scope of demolition and removal work is indicated on drawings and specified in Section 02 4100.

B. Scope of alterations work is indicated on drawings.

C. Plumbing: Alter existing system and add new construction, keeping existing in operation.

D. HVAC: Alter existing system and add new construction, keeping existing in operation.

E. Electrical Power and Lighting: Alter existing system and add new construction, keeping existing in operation.

F. Owner will remove the following items before start of work:
   1. Furniture, fixtures, and equipment.

1.04 OWNER OCCUPANCY

A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.

B. Owner intends to occupy the Project upon Substantial Completion.

C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

D. Schedule the Work to accommodate Owner occupancy.

1.05 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.
   1. Locate and conduct construction activities in ways that will limit disturbance to site.

B. Arrange use of site and premises to allow:
   1. Owner occupancy.
   2. Work by Others.
   3. Work by Owner.
   4. Use of site and premises by the public.

C. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.

D. Utility Outages and Shutdown:
   1. Coordinate all shutdown of utility services with Owner. Provide a minimum of one week notice.

1.06 WORK SEQUENCE

A. Coordinate construction schedule and operations with Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2000
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Documentation of changes in Contract Sum and Contract Time.

C. Change procedures.

D. Correlation of Contractor submittals based on changes.

E. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

A. Section 00 5200 - Agreement Form: Contract Sum, retainages, payment period, monetary values of unit prices.

B. Section 00 7200 - General Conditions: Additional requirements for progress payments, final payment, changes in the Work.

C. Section 00 7300 - Supplementary Conditions: Percentage allowances for Contractor's overhead and profit.

D. Section 01 7800 - Closeout Submittals: Project record documents.

1.03 SCHEDULE OF VALUES

A. Form to be used: AIA G703.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.

C. Forms filled out by hand will not be accepted.

D. Submit Schedule of Values electronically within 15 days after date of Owner-Contractor Agreement.

E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.

F. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.

G. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Form to be used: AIA G702 and G703.

C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

D. Forms filled out by hand will not be accepted.

E. Execute certification by signature of authorized officer.

F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.

H. Submit one electronic copy of each Application for Payment.

I. Include the following with the application:
   1. Transmittal letter as specified for submittals in Section 01 3000.

2. Construction progress schedule, revised and current as specified in Section 01 3000.
3. Affidavits attesting to off-site stored products.
4. Partial release of liens from major subcontractors and vendors.
    a. Submit partial waivers on each item for amount requested in previous application after deduction of retainage, on each item.
    b. When application shows completion of an item, submit final or full waivers.
    c. Owner reserves the right to designate which entities involved in the Work must submit waivers.

J. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 MODIFICATION PROCEDURES

A. Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on Architect's Supplemental Instructions Form.

B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
2. Promptly execute the change.

C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change . Contractor shall prepare and submit a fixed price quotation within 20 days.

D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on work by separate or other contractors. Document any requested substitutions in accordance with Section 01 6000.

E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.

F. Substantiation of Costs: Provide full information required for evaluation.
1. On request, provide the following data:
    a. Quantities of products, labor, and equipment.
    b. Taxes, insurance, and bonds.
    c. Overhead and profit.
    d. Justification for any change in Contract Time.
    e. Credit for deletions from Contract, similarly documented.
2. Support each claim for additional costs with additional information:
    a. Origin and date of claim.
    b. Dates and times work was performed, and by whom.
    c. Time records and wage rates paid.
    d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

J. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:
1. All closeout procedures specified in Section 01 7000.
2. Evidence of completion of Project closeout requirements.
3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
4. AIA Document G706, " Contractors Affidavit of Payment of Debts and Claims".
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens.
6. Verification of withholding of Minnesota income tax from wages paid to employees relating to contract services with the State of Minnesota and/or subdivisions, Minnesota Department of Revenue From IC-134.
7. Evidence that claims have been settled.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 2500
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

A. Section 00 4325 - Substitution Request Form - During Procurement: Required form for substitution requests made prior to award of contract (During procurement).

B. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.

C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
   1. Forms indicated in the Project Manual are adequate for this purpose, and must be used.

D. Limit each request to a single proposed substitution item.
   1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

A. Submittal Time Restrictions:
   1. Instructions to Bidders specifies time restrictions and the documents required for submitting substitution requests during the bidding period.

B. Submittal Form (before award of contract):
   1. Submit substitution requests by completing the form in Section 00 4325; see this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.

3.03 RESOLUTION

A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.

B. Architect will notify Contractor in writing of decision to accept or reject request.
   1. Architect's decision following review of proposed substitution will be noted on the submitted form.

3.04 ACCEPTANCE

A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

END OF SECTION

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General administrative requirements.

B. Electronic document submittal service.

C. Preconstruction meeting.

D. Progress meetings.

E. Construction progress schedule.

F. Coordination drawings.

G. Submittals for review, information, and project closeout.

H. Number of copies of submittals.

I. Requests for Interpretation (RFI) procedures.

J. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Section 00 7200 - General Conditions: Dates for applications for payment.

B. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.

C. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 REFERENCE STANDARDS

A. AIA G716 - Request for Information.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Schedule meeting after Notice of Award.

B. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractor.

C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.
   4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
   5. Designation of personnel representing the parties to Contract and Architect.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   7. Scheduling.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.

B. Attendance Required:

1. Contractor.
2. Owner.
3. Architect.
4. Contractor's superintendent.
5. Major subcontractors.

C. Agenda:
1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of RFIs log and status of responses.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to work.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE

A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
1. Include written certification that major contractors have reviewed and accepted proposed schedule.

D. Within 10 days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment.

3.04 REQUESTS FOR INTERPRETATION (RFI)

A. Definition: A request seeking one of the following:
1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.

B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.

C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
1. Prepare a separate RFI for each specific item.
a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
b. Do not forward requests which solely require internal coordination between subcontractors.
2. Prepare in a format and with content acceptable to Owner.
a. Use AIA G716 - Request for Information .
3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.

D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
   1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
   2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
      a. Approval of submittals (use procedures specified elsewhere in this section).
   3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
   4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.

3.05 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.

C. Samples will be reviewed for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.06 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.08 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Use a single transmittal for related items.

2. Transmit using approved form.
    a. Use Contractor's form, subject to prior approval by Architect.
3. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
4. 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 the requirements of the work and Contract Documents.
    a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
5. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
    a. Send submittals in electronic format via email to Architect.

B. Product Data Procedures:
1. Submit only information required by individual specification sections.
2. Collect required information into a single submittal.
3. Do not submit (Material) Safety Data Sheets for materials or products.

C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
2. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

3.09 SUBMITTAL REVIEW

A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.

B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.

C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.

D. Architect's and consultants' actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:
    a. "Approved", or language with same legal meaning.
    b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
        1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
    c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
2. Not Authorizing fabrication, delivery, and installation:
    a. "Revise and Resubmit".
        1) Resubmit revised item, with review notations acknowledged and incorporated.
    b. "Rejected".
        1) Submit item complying with requirements of Contract Documents.

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. References and standards.

C. Testing and inspection agencies and services.

D. Control of installation.

E. Mock-ups.

F. Tolerances.

G. Manufacturers' field services.

H. Defect Assessment.

1.02 RELATED REQUIREMENTS

A. Document 00 3100 - Available Project Information: Hazardous materials report.

B. Document 00 7200 - General Conditions: Inspections and approvals required by public authorities.

C. Section 01 3000 - Administrative Requirements: Submittal procedures.

D. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.03 REFERENCE STANDARDS

A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants.

B. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.

C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry.

D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing.

G. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components.

H. IAS AC89 - Accreditation Criteria for Testing Laboratories.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.

i. Results of test/inspection.
j. Compliance with Contract Documents.
k. When requested by Architect, provide interpretation of results.

2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.

C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
1. Submit report in duplicate within 30 days of observation to Architect for information.
2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.05 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

F. 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 uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

1.06 TESTING AND INSPECTION AGENCIES AND SERVICES

A. As indicated in individual specification sections, Owner or Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

C. Contractor Employed Agency:
1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM E699, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
3. Laboratory Qualifications: Accredited by IAS according to IAS AC89.
4. Laboratory: Authorized to operate in the State in which the Project is located.
5. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.

6. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 TESTING AND INSPECTION

A. See individual specification sections for testing and inspection required.

B. Testing Agency Duties:
   1. Test samples of mixes submitted by Contractor.
   2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   3. Perform specified sampling and testing of products in accordance with specified standards.
   4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
   6. Perform additional tests and inspections required by Architect.
   7. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:

a. To provide access to Work to be tested/inspected.
b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
c. To facilitate tests/inspections.
d. To provide storage and curing of test samples.

4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.

F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.04 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary sanitary facilities.

C. Temporary Controls: Barriers.

D. Waste removal facilities and services.

1.02 TEMPORARY UTILITIES

A. Owner will provide the following:
   1. Electrical power, consisting of connection to existing facilities.
   2. Water supply, consisting of connection to existing facilities.

B. Existing facilities may not be used.

C. New permanent facilities may not be used.

D. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Use of existing facilities is not permitted.

C. New permanent facilities may not be used during construction operations.

D. Maintain daily in clean and sanitary condition.

E. At end of construction, return facilities to same or better condition as originally found.

1.04 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.05 INTERIOR ENCLOSURES

A. Provide temporary partitions as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

1.06 VEHICULAR ACCESS AND PARKING

A. Coordinate access and haul routes with governing authorities and Owner.

B. Provide and maintain access to fire hydrants, free of obstructions.

1.07 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site periodically.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.08 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition.

E. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5713
TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Restoration of areas eroded due to insufficient preventive measures.

D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.02 REFERENCE STANDARDS

A. MNDOT Standard Specification for Construction; 2020 Edition.

B. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc-Type Apparatus.

C. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

D. ASTM D4533/D4533M - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

E. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

F. ASTM D4751 - Standard Test Methods for Determining Apparent Opening Size of a Geotextile.

G. ASTM D4873/D4873M - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.

H. MPCA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; current edition.

I. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit.

1.03 PERFORMANCE REQUIREMENTS

A. Comply with all requirements of Minnesota Pollution Control Agency (MPCA) for erosion and sedimentation control, as specified for the National Pollutant Discharge Elimination System (NPDES), under requirements for the current edition Construction General Permit (CGP).

B. Comply with requirements of State of Minnesota Erosion and Sedimentation Control Manual.

C. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.

D. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
   1. Obtain and pay for permits and provide security required by authority having jurisdiction.
   2. Owner will withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.

E. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

F. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
   1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
   2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.

G. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
   1. Control movement of sediment and soil from temporary stockpiles of soil.
   2. Prevent development of ruts due to equipment and vehicular traffic.
   3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

H. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
   1. Prevent windblown soil from leaving the project site.
   2. Prevent tracking of mud onto public roads outside site.
   3. Prevent mud and sediment from flowing onto sidewalks and pavements.
   4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

I. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
   2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

J. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

K. Open Water: Prevent standing water that could become stagnant.

L. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Erosion and Sedimentation Control Plan:
   1. Submit within 2 weeks after Notice to Proceed.
   2. Include:
      a. Site plan identifying soils and vegetation, existing erosion problems, and areas vulnerable to erosion due to topography, soils, vegetation, or drainage.
      b. Site plan showing grading; new improvements; temporary roads, traffic accesses, and other temporary construction; and proposed preventive measures.
      c. Where extensive areas of soil will be disturbed, include storm water flow and volume calculations, soil loss predictions, and proposed preventive measures.
      d. Schedule of temporary preventive measures, in relation to ground disturbing activities.
      e. Other information required by law.
      f. Format required by law is acceptable, provided any additional information specified is also included.
   3. Obtain the approval of the Plan by authorities having jurisdiction.
   4. Obtain the approval of the Plan by Owner.

C. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.

D. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

PART 2 PRODUCTS

2.01 MATERIALS

A. Mulch: Use one of the following:
   1. Straw or hay.
   2. Erosion control matting or netting.

B. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
   1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.
   2. Permittivity: 0.05 sec^-1, minimum, when tested in accordance with ASTM D4491/D4491M.
   3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355/D4355M after 500 hours exposure.
   4. Tensile Strength: 100 pounds-force, minimum, in cross-machine direction; 124 pounds-force, minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.
   5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.
   6. Tear Strength: 55 pounds-force, minimum, when tested in accordance with ASTM D4533/D4533M.
   7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.

C. Silt Fence Posts: One of the following, minimum 5 feet long:

D. Stone: 1-2 inch diameter.

E. Riprap: 1-2 inch diameter washed rock.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 INSTALLATION

A. Silt Fences:
   1. Store and handle fabric in accordance with ASTM D4873/D4873M.
   2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.
   3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.
   4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
   5. Install with top of fabric at nominal height and embedment as specified.
   6. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
   7. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.

B. Mulching Over Large Areas:

1. Dry Straw and Hay: Apply 2-1/2 tons per acre; anchor using dull disc harrow or emulsified asphalt applied using same spraying machine at 100 gallons of water per ton of mulch.
2. Erosion Control Matting: Comply with manufacturer's instructions.

C. Mulching Over Small and Medium Areas:
1. Dry Straw and Hay: Apply 4 to 6 inches depth.
2. Erosion Control Matting: Comply with manufacturer's instructions.

D. Riprap at Outlets:
1. Provide riprap outlets as indicated on plans in accordance with MnDOT Standard Plate No. 3133C.

E. Access Road Sediment Control:
1. Provide rock constructed entrance where indicated on plans to prevent excess mud and sediment from being deposited on streets.

3.04 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

C. Silt Fences:
1. Promptly replace fabric that deteriorates unless need for fence has passed.
2. Remove silt deposits that exceed one-third of the height of the fence.
3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

D. Clean out temporary sediment control structures weekly and relocate soil on site.

E. Place sediment in appropriate locations on site; do not remove from site.

3.05 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade, seed and finish to match adjacent ground surfaces.

D. Submit Notice of Termination of as indicated in the permit.

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations.

F. Procedures for Owner-supplied products.

G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Lists of products to be removed from existing building.

B. Section 01 2500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.

C. Section 01 4000 - Quality Requirements: Product quality monitoring.

1.03 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.

B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

D. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is required.

1. See Section 01 1000 for list of items required to be salvaged for reuse and relocation.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

A. See Section 01 2500 - Substitution Procedures.

B. Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period and the documents required. Comply with requirements specified in Section 00 2213.

C. Architect will consider requests for substitutions only within 15 days after date of Agreement.

D. Substitutions will be considered when a product, through no fault of the Contractor, becomes unavailable or unsuitable due to regulatory charge.

E. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

F. A request for substitution constitutes a representation that the submitter:
   1. A request for substitution constitutes a representation that the submitter:
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to O.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.
   5. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.

G. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

H. Substitution Submittal Procedure (after contract award):
   1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
   3. Architect will notify Contractor in writing of decision to accept or reject request.

3.02 OWNER-SUPPLIED PRODUCTS

A. See Section 01 1000 - Summary for identification of Owner-supplied products.

B. Owner's Responsibilities:
   1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
   2. Arrange and pay for product delivery to site.
   3. On delivery, inspect products jointly with Contractor.
   4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   5. Arrange for manufacturers' warranties, inspections, and service.

C. Contractor's Responsibilities:
   1. Review Owner reviewed shop drawings, product data, and samples.
   2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
   3. Handle, store, install and finish products.
   4. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

H. Comply with manufacturer's warranty conditions, if any.

I. Do not store products directly on the ground.

J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

K. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

L. Prevent contact with material that may cause corrosion, discoloration, or staining.

M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

N. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

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SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Pre-installation meetings.

D. Cutting and patching.

E. Surveying for laying out the work.

F. Cleaning and protection.

G. Starting of systems and equipment.

H. Demonstration and instruction of Owner personnel.

I. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

J. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.

C. Section 01 4000 - Quality Requirements: Testing and inspection procedures.

D. Section 01 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.

E. Section 01 5000 - Temporary Facilities and Controls: Temporary interior partitions.

F. Section 01 5713 - Temporary Erosion and Sediment Control: Additional erosion and sedimentation control requirements.

G. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

H. Section 02 4100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.

I. Section 07 8400 - Firestopping.

1.03 REFERENCE STANDARDS

1.04 QUALIFICATIONS

A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

1.05 PROJECT CONDITIONS

A. Use of explosives is not permitted.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

E. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
   1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
   2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

F. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

1.06 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Contractor shall locate and protect survey control and reference points.

D. Control datum for survey is that indicated on drawings.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

H. Utilize recognized engineering survey practices.

I. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.

J. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations; and _____.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations, and _____.

K. Periodically verify layouts by same means.

L. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
   1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
   2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.
   3. Relocate items indicated on drawings.
   4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
   3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
      a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
      b. Provide temporary connections as required to maintain existing systems in service.
   4. Verify that abandoned services serve only abandoned facilities.
   5. Remove abandoned pipe, ducts, conduits, and equipment , including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

F. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.

G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
   1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.

2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
3. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.

H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

I. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

J. Clean existing systems and equipment.

K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

L. Do not begin new construction in alterations areas before demolition is complete.

M. Comply with all other applicable requirements of this section.

3.07 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:
1. Complete the work.
2. Fit products together to integrate with other work.
3. Provide openings for penetration of mechanical, electrical, and other services.
4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-complying work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

J. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
2. Match color, texture, and appearance.
3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.08 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.09 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.10 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.

B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

D. Verify that wiring and support components for equipment are complete and tested.

E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.11 DEMONSTRATION AND INSTRUCTION

A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.

3.12 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

B. Testing, adjusting, and balancing HVAC systems: See Section 23 0593 - Testing, Adjusting, and Balancing for HVAC.

3.13 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.
   1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

B. Use cleaning materials that are nonhazardous.

C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

F. Clean filters of operating equipment.

G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, drainage systems, and _____.

H. Clean site; sweep paved areas, rake clean landscaped surfaces.

I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.14 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.15 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

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SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project record documents.

B. Operation and maintenance data.

C. Materials transparency manual.

D. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 00 7200 - General Conditions and 00 7300 - Supplementary Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.

D. Individual Product Sections: Specific requirements for operation and maintenance data.

E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   3. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Additional information as specified in individual product specification sections.

D. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

D. Include color coded wiring diagrams as installed.

E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

G. Provide servicing and lubrication schedule, and list of lubricants required.

H. Include manufacturer's printed operation and maintenance instructions.

I. Include sequence of operation by controls manufacturer.

J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

K. Provide control diagrams by controls manufacturer as installed.

L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

O. Include test and balancing reports.

P. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Electronic Format: Manuals shall be provided in PDF format, placed on thumbdrive 2.0 or greater.

D. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

E. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

F. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

G. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

H. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

I. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.

J. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

K. Arrangement of Contents: Organize each volume in parts as follows:
   1. Project Directory.
   2. Table of Contents, of all volumes, and of this volume.
   3. Operation and Maintenance Data: Arranged by system, then by product category.

a. Source data.
b. Product data, shop drawings, and other submittals.
c. Operation and maintenance data.
d. Field quality control data.
e. Photocopies of warranties and bonds.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 01 9113
GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Commissioning is intended to achieve the following specific objectives; this section specifies the Contractor's responsibilities for commissioning:
   1. Verify that the work is installed in accordance with Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Prefunctional Checklists executed by Contractor are utilized to achieve this.
   2. Verify and document that functional performance is in accordance with Contract Documents: Functional Tests executed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
   3. Verify that operation and maintenance manuals submitted to Owner are complete: Detailed operation and maintenance (O&M) data submittals by Contractor are utilized to achieve this.
   4. Verify that the Owner's operating personnel are adequately trained: Formal training conducted by Contractor is utilized to achieve this.

B. Commissioning, including Functional Tests, O&M documentation review, and training, is to occur after startup and initial checkout and be completed before Substantial Completion.

C. The Commissioning Authority directs and coordinates all commissioning activities; this section describes some but not all of the Commissioning Authority's responsibilities.

D. The Commissioning Authority is employed by Owner.

1.02 SCOPE OF COMMISSIONING

A. The following are to be commissioned:

B. Building envelope:
   1. Air tightness.

C. HVAC System, as outlined in Section 23 0800.

D. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.

1.03 RELATED REQUIREMENTS

A. Section 01 7800 - Closeout Submittals: Scope and procedures for operation and maintenance manuals and project record documents.

B. Section 23 0800 - Commissioning of HVAC: HVAC control system testing; other requirements.

1.04 REFERENCE STANDARDS

A. ASTM E779 - Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.

B. ASTM E1827 - Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures; except:
   1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority, unless they require review by Architect; in that case, submit to Architect first.
   2. Submit one copy to the Commissioning Authority, not to be returned.
   3. Make commissioning submittals on time schedule specified by Commissioning Authority.

4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of Prefunctional Checklists or Functional Test requirements; submit in editable electronic format, Microsoft Word 2010 preferred.
5. As soon as possible after submittals made to Architect are approved, submit copy of approved submittal to the Commissioning Authority.

B. Product Data: If submittals to Architect do not include the following, submit copies as soon as possible:
1. Manufacturer's product data, cut sheets, and shop drawings.
2. Manufacturer's installation instructions.
3. Startup, operating, and troubleshooting procedures.
4. Fan and pump curves.
5. Factory test reports.
6. Warranty information, including details of Owner's responsibilities in regard to keeping warranties in force.

C. Manufacturers' Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 COMMISSIONING PLAN

A. Commissioning Authority has prepared the Commissioning Plan.
1. Attend meetings called by the Commissioning Authority for purposes of completing the commissioning plan.
2. Require attendance and participation of relevant subcontractors, installers, suppliers, and manufacturer representatives.

B. Contractor is responsible for compliance with the Commissioning Plan.

C. Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.

D. Commissioning Schedule:
1. Submit anticipated dates of startup of each item of equipment and system to Commissioning Authority within 60 days after award of Contract.
2. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.
3. Prefunctional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
4. Provide sufficient notice to Commissioning Authority for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

3.02 CONTINUOUS AIR BARRIER DESIGN AND VERIFICATION PROGRAM

A. Independent firm to verify the design and installation of the continuous air barrier to determine compliance with the following:
1. Conduct a design review to verify and document compliance with the current adopted and amended energy code.
2. As construction progresses, conduct periodic field inspection of the continuous air barrier materials and assemblies while the continuous air barrier is still accessible for inspection.
3. Document compliance with the requirements of the current adopted and amended energy code. Copies to be provided to the Owner and included with project closeout documents.
4. See Section 01 7800 - Closeout Submittals for additional requirements.

B. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.

3.03 BUILDING ENVELOPE COMMISSIONING

A. General: Comply with the following procedural requirements:
1. ASTM E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.

2. ASTM E1827 Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door.

B. Verify that the building envelope has been sufficiently completed for testing to commence.

C. Conduct ongoing inspections as construction progresses to document satisfactory installation conditions. related to thermal and moisture integrity of the building envelope that become concealed upon completion of construction.

D. Submit a detailed narrative of proposed pressure test procedures prior to the test. Include a plan view showing proposed installation locations (personnel doors or other similar openings) for blower doors (or flexible ducts for trailer-mounted fans, if used).

E. Avoid testing on days forecast to experience high winds, rain, or snow.

F. Test the completed building and demonstrate that the air leakage rate of the building envelope does not exceed the specified requirements.

G. Determine location and nature of undesirable air leakage pathways using methods specified in ASTM E1186-17 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.

3.04 OPERATION AND MAINTENANCE MANUALS

A. See Section 01 7800 - Closeout Submittals for additional requirements.

B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.

C. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.

D. Commissioning Authority will add commissioning records to manuals after submission to Owner.

END OF SECTION

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DIVISION 02



EXISTING CONDITIONS

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SECTION 02 4100
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 1000 - Summary: Description of items to be salvaged or removed for re-use by Contractor.

C. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

D. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.

E. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

F. Section 31 2323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.05 MATERIALS OWNERSHIP

A. Historic items, relics or similar items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each items in a manner to prevent damage and deliver to Owner.

1.06 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.

1.07 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 DEMOLITION

A. Remove paving and curbs required to accomplish new work.

B. Remove concrete slabs on grade within construction limits indicated on drawings.

C. Remove other items indicated, for salvage, relocation, and recycling.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Comply with applicable requirements of NFPA 241.
   3. Use of explosives is not permitted.

4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
5. Provide, erect, and maintain temporary barriers and security devices.
6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
8. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.
9. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Do not begin removal until vegetation to be relocated has been removed and vegetation to remain has been protected from damage.

E. Protect existing structures and other elements to remain in place and not removed.
1. Provide bracing and shoring.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

F. Minimize production of dust due to demolition operations. Do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

G. Hazardous Materials:
1. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCBs, and mercury.

H. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone. Identify and mark, in same manner as other utilities to remain, utilities to be reconnected.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
1. Verify construction and utility arrangements are as indicated.
2. Report discrepancies to Architect before disturbing existing installation.

3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from areas that remain occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure, except for interruptions required for replacement or modifications; prevent water and humidity damage.

D. Remove existing work as indicated and required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction indicated.
   2. Remove items indicated on drawings.

E. Services including, but not limited to, HVAC, Plumbing, and Electrical: Remove existing systems and equipment as indicated.
   1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. See Section 01 1000 - Summary for limitations on outages and required notifications.
   4. Verify that abandoned services serve only abandoned facilities before removal.
   5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. Protect existing work to remain.
   1. Prevent movement of structure. Provide shoring and bracing as required.
   2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch to match new work.

3.05 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Storage or sale of removed items or materials on-site is not permitted.

C. Remove materials not to be reused on site; do not burn or bury.

D. Leave site in clean condition, ready for subsequent work.

E. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

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DIVISION 03



CONCRETE

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SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.

B. Floors and slabs on grade.

C. Sidewalks.

D. Footings and foundations.

E. Concrete reinforcement.

F. Joint devices associated with concrete work.

G. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary.

B. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide.

C. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction.

D. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

E. ACI PRC-305 - Guide to Hot Weather Concreting.

F. ACI PRC-306 - Guide to Cold Weather Concreting.

G. ACI PRC-308 - Guide to External Curing of Concrete.

H. ACI PRC-347 - Guide to Formwork for Concrete.

I. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials.

J. ACI SPEC-301 - Specifications for Concrete Construction.

K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

L. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

M. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

N. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

O. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

P. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens).

Q. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.

R. ASTM C150/C150M - Standard Specification for Portland Cement.

S. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.

T. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

U. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.

V. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

W. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.

X. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

Y. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.

Z. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.

AA. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

BB. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

CC. ICC (IBC) - International Building Code.

DD. MNDOT Specifications for Construction - 2020 Edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI SPEC-301, Section 4 - Concrete Mixtures.
   2. Indicate proposed mix design complies with requirements of ACI CODE-318, Chapter 5 - Concrete Quality, Mixing and Placing.

C. Test Reports: Submit report for each test or series of tests specified.

D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI SPEC-301 and ACI CODE-318.

B. Follow recommendations of ACI PRC-305 when concreting during hot weather.

C. Follow recommendations of ACI PRC-306 when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI PRC-347 to provide formwork that will produce concrete complying with tolerances of ACI SPEC-117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
   2. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished, unless otherwise indicated.

B. Steel Welded Wire Reinforcement (WWR): Plain type, ASTM A1064/A1064M.
   1. Form: Flat Sheets.
   2. WWR Style: As indicated on drawings.

C. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
   1. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M. Class 3M coarse aggregate or better, graded.
   1. Maximum Coarse-Aggregate Size: 1 inch nominal.
   2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
   3. Acquire aggregates for entire project from same source.

C. Fly Ash: ASTM C618, Class C or F.

D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

E. No admixtures shall be used except with specific written approval from the architect.

2.04 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

2.05 ACCESSORY MATERIALS

A. Underslab Vapor Retarder:
   1. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single-ply polyethylene is prohibited.
   2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
   3. Products:
      a. Henry, a Carlisle Company; Moistop Ultra 15: www.henry.com/#sle.
      b. ISI Building Products; Viper VaporCheck II 15-mil (Class A): www.isibp.com/#sle.
      c. Stego Industries, LLC; Stego Wrap Class A Vapor Retarder: www.stegoindustries.com/#sle.
      d. W. R. Meadows, Inc; PERMINATOR Class A - 15 mils (0.38 mm): www.wrmeadows.com/#sle.
      e. Substitutions: See Section 01 6000 - Product Requirements.

2.06 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
   1. Products:
      a. Kaufman Products Inc; SureWeld: www.kaufmanproducts.net/#sle.
      b. W. R. Meadows, Inc; ACRY-LOK: www.wrmeadows.com/#sle.
      c. Substitutions: See Section 01 6000 - Product Requirements.

B. Epoxy Bonding System:
   1. Complying with ASTM C881/C881M and of Type required for specific application.
   2. Products:
      a. Kaufman Products Inc; SurePoxy HM EPL: www.kaufmanproducts.net/#sle.
      b. W. R. Meadows, Inc; Rezi-Weld Gel Paste, Rezi-Weld Gel Paste State, Rezi-Weld 1000: www.wrmeadows.com/#sle.
      c. Substitutions: See Section 01 6000 - Product Requirements.

C. Slab Isolation Joint Filler: 1/2-inch thick, height equal to slab thickness, with removable top section forming 1/2-inch deep sealant pocket after removal.

D. Sealant: As Specified in 07 9200 - Joint Sealants.

2.07 CURING MATERIALS

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
   1. Products:
      a. Euclid Chemical Company ; EUCOBAR: www.euclidchemical.com/#sle.
      b. Kaufman Products Inc; VaporAid: www.kaufmanproducts.net/#sle.
      c. Master Builders Solutions: www.master-builders-solutions.com/en-us/#sle.
      d. W. R. Meadows, Inc; Evapre or Evapre-RTU: www.wrmeadows.com/#sle.
      e. Substitutions: See Section 01 6000 - Product Requirements.

B. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.

C. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silconate materials and proprietary components; odorless; that pentrates, hardens, and densifies concrete surfaces.
   1. Acceptable Products:
      a. Euclid Chemical Company; UltraGuard: www.euclidchemical.com/#sle.
      b. Kaufman Products Inc; SureHArd LS: www.kaufmanproducts.net/#sle.
      c. W. R. Meadows, Inc; Liqui-Hard Ultra: www.wrmeadows.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.

D. Moisture-Retaining Sheet: ASTM C171.
   1. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
   2. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.

E. Water: Potable, not detrimental to concrete.

2.08 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI SPEC-301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.

2.09 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength: 3,000 psi (20.7 MPa) at 28 days.
   2. Maximum Water-Cementitious Materials Ratio: 0.55. (non air-entrained).
   3. Slump Limit: 4 inches, plus or minus 1 inch.

B. Foundation Walls: Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength: 3,000 psi (20.7 MPa) at 28 days.
   2. Maximum Water-Cementitious Materials Ratio: 0.55. (non air-entrained).
   3. Slump Limit: 4 inches, plus or minus 1 inch.

C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength: 4,000 psi (27.6 MPa) at 28 days.
   2. Maximum Water-Cementitious Materials Ratio: 0.46 (non air-entrained) and 0.45 (air-entrained).
   3. Slump Limit: 5 inches, plus or minus 1 inch.

D. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than portland cement according to ACI SPEC-301 requirements.

1. Add air entraining agent to mix for concrete exposed to freeze-thaw cycling to provide 5 ½ to 6 ½% air at placement of concrete.

E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash: 25 percent.
   2. Combined Fly Ash and Pozzolan: 25 percent.
   3. Silica Fume: 10 percent.
   4. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.

F. Maximum Water-Cementitious Materials Ratio: 0.45 for concrete exposed to deicers or subject to freezing and thawing while moist.

2.10 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Formwork: Comply with requirements of ACI SPEC-301. Design and fabricate forms to support all applied loads until concrete is cured and for easy removal without damage to concrete.

B. Verify that forms are clean and free of rust before applying release agent.

C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
   2. Use latex bonding agent only for non-load-bearing applications.

E. 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.

F. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
   1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.

3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of ACI SPEC-301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.04 PLACING CONCRETE

A. Place concrete in accordance with ACI PRC-304.

B. Place concrete for floor slabs in accordance with ACI PRC-302.1.

C. Notify Architect not less than 24 hours prior to commencement of placement operations.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Ensure reinforcement, inserts, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

G. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 SLAB JOINTING

A. Locate joints as indicated on drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Maximum Variation of Surface Flatness:
   1. Exposed Concrete Floors: 1/4 inch in 10 feet.
   2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
   3. Under Carpeting: 1/4 inch in 10 feet.

B. Correct the slab surface if tolerances are less than specified.

C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.07 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Concrete Slabs: Finish to requirements of ACI PRC-302.1 and as follows:
   1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI PRC-302.1; thin floor coverings include carpeting, resilient flooring, and thin set ceramic tile.
   2. Other Surfaces to Be Left Exposed: Trowel as described in ACI PRC-302.1, minimizing burnish marks and other appearance defects.

C. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

3.08 CURING AND PROTECTION

A. Comply with requirements of ACI PRC-308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than seven days.

C. Surfaces Not in Contact with Forms:
   1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
      a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.

b. Spraying: Spray water over floor slab areas and maintain wet.
c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.

2. Final Curing: Begin after initial curing but before surface is dry.
   a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.
   b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.
3. No curing compounds shall be used where the following flooring products are installed:
   a. 09 6500 - Resilient Flooring.

3.09 LIQUID FLOOR TREATMENTS - CONCRETE SEALER

A. Unless otherwise noted all interior concrete floors to shall be sealed.

B. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
   1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
   2. Do not apply to concrete that is less than seven days' old.
   3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

3.10 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

B. Verification and testing shall be in conformance with Table 1704.4 of the ICC (IBC).

C. Provide free access to concrete operations at project site 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 concrete operations.

E. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

F. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.

G. Compressive Strength Specimans: ASTM C39/C39M. Obtain test samples for every 100 cu yd or less of each class of concrete placed each day.
   1. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.

H. Compressive-Strength Tests: ASTM C39/C39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   1. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

I. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

J. 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 (3.4 MPa).

K. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

L. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

M. Air Content: ASTM C231/C231M-24, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

N. Continuous monitoring of concrete placement for proper application techniques.

O. Concrete Temperature: ASTM C1064/C1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.

P. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

3.11 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.12 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

DIVISION 04



MASONRY

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SECTION 04 0100
MAINTENANCE OF MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water cleaning of _____ surfaces.

B. Repointing mortar joints.

C. Repair of damaged masonry.

1.02 RELATED REQUIREMENTS

A. Section 04 2000 - Unit Masonry: Brick and Concrete masonry units.

B. Section 04 2000 - Unit Masonry: Mortar and grout.

1.03 REFERENCE STANDARDS

A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work of this section.
   1. Require attendance of parties directly affecting work of this section.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's product data and MSDS sheets on CFRP systems, including physical and chemical characteristics, material specifications for each component, limitations on use of system, construction or application instructions, maintenance instructions, and general manufacturer's recommendations regarding each system.

1.06 QUALITY ASSURANCE - MASONRY WORK

A. Restorer: Company specializing in masonry restoration with minimum three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry neatly stacked and tied on pallets. Store clear of ground with adequate waterproof covering.

B. Store materials in covered, well-ventilated area protected from exposure to detrimental conditions, including airborne contaminants, dirt, dust, sunlight, temperatures lower than 40 degrees F or greater than 100 degrees F, rainfall, sparks, or flame, and in accordance with the manufacturer's requirements. Store polymer resins and hardeners in separate area from construction materials that can absorb odors.

1.08 FIELD CONDITIONS - MASONRY WORK

A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS

A. Cleaning Agent: Detergent type.

B. Cleaning Agent: 0.5 lb of sodium hydrosulfite mixture to one gallon of water.

2.02 MORTAR MATERIALS

A. Comply with requirements of Section 04 2000.

2.03 MASONRY MATERIALS

A. Brick: Section 04 2000.

B. Block: Section 04 2000.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces to be cleaned are ready for work of this section.

3.02 PREPARATION

A. Protect surrounding elements from damage due to restoration procedures.

B. Carefully remove and store removable items located in areas to be restored, including fixtures, fittings, finish hardware, and accessories; reinstall upon completion.

C. Separate areas to be protected from restoration areas using means adequate to prevent damage.

D. Mask immediately adjacent surfaces with material that will withstand cleaning and restoration procedures.

3.03 REPOINTING

A. Perform repointing prior to cleaning masonry surfaces.

B. Cut out loose or disintegrated mortar in joints to minimum 1/2 inch depth or until sound mortar is reached.

C. Use power tools only after test cuts determine no damage to masonry units will result.

D. Do not damage masonry units.

E. When cutting is complete, remove dust and loose material by brushing.

F. Premoisten joint and apply mortar. Pack tightly in maximum 1/4 inch layers. Form a smooth, compact concave joint to match existing.

G. Moist cure for 72 hours.

3.04 CLEANING EXISTING MASONRY

A. Cleaning Detergent: Brush clean masonry surfaces at _____ locations with cleaning agent in accordance with the manufacturer's instructions. Saturate masonry with clean water and flush loose mortar and dirt.

3.05 CLEANING

A. Immediately remove stains, efflorescence, or other excess resulting from the work of this section.

B. Remove excess mortar, smears, and droppings as work proceeds and upon completion.

C. Clean surrounding surfaces.

END OF SECTION

SECTION 04 2000
UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete block.

B. Common brick.

C. Mortar and grout.

D. Reinforcement and anchorage.

E. Flashings.

F. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 05 5000 - Metal Fabrications: Loose steel lintels.

B. Section 07 8400 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

B. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement.

C. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

D. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units.

E. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.

F. ASTM C150/C150M - Standard Specification for Portland Cement.

G. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.

H. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale).

I. ASTM C270 - Standard Specification for Mortar for Unit Masonry.

J. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.

K. ASTM C476 - Standard Specification for Grout for Masonry.

L. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry.

M. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing.

N. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls.

O. BIA Technical Notes No. 46 - Maintenance of Brick Masonry.

P. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures.

Q. NCMA TEK 08-02 - Removal of Stains From Concrete Masonry Walls; 1998.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data for masonry units.

C. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.

1.05 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.07 PROJECT 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.

B. 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 sills, ledges, and projections from mortar droppings.
   2. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
   2. Special Shapes: Provide non-standard blocks configured for corners, lintels, headers, control joint edges, and other detailed conditions.
   3. Nonloadbearing Units: ASTM C129.
      a. Hollow block, as indicated.
      b. Normal weight.
      c. Pattern: Smooth face where indicated on drawings.

2.02 BRICK UNITS

A. Facing Brick: ASTM C216, Type FBX, Grade SW.
   1. Color and texture to match existing and approved by Architect.

2.03 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
   1. Hydrated Lime: ASTM C207, Type S.
   2. Mortar Aggregate: ASTM C144.
   3. Grout Aggregate: ASTM C404.

B. Water: Clean and potable.

C. Accelerating Admixture: Nonchloride type for use in cold weather, ASTM C494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.
   1. Manufacturers:
      a. BASF Construction Chemicals.; Product Trimix-NCA: www.buildingsystems.basf.com.
      b. Euclid Chemical Co.; Product Accelguard 80: www.euclidchemical.com.
      c. W. R. Grace & Co., Construction Products Division; Product Morset: www.na.graceconstruction.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.

D. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
   1. Type: Types as scheduled in this section.
   2. Color: Mineral pigments added as required to produce approved color sample.
   3. Water-repellent mortar for use with water repellent masonry units.

E. Packaged Dry Material for Mortar for Repointing: Premixed Portland cement, hydrated lime, and graded sand; capable of producing Type O mortar in accordance with ASTM C270 with the addition of water only.
   1. Color: Standard gray.

2.04 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:
   1. Hohmann & Barnard, Inc: www.h-b.com/sle.
   2. WIRE-BONDwww.wirebond.com/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. Single Wythe Joint Reinforcement: ASTM A951/A951M.
   1. Type: Truss or ladder.
   2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to 16 CFR 1201 Class B.
   3. Size: 0.1875 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.

2.05 FLASHINGS

A. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.

B. Termination Bars: Stainless steel; compatible with membrane and adhesives.

C. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

2.06 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
   1. Manufacturers:
      a. Blok-Lok Limited; RS Series: www.blok-lok.com.
      b. Hohmann & Barnard, Inc (including Dur-O-Wal brand); RS Series: www.h-b.com.
      c. WIRE-BOND: www.wirebond.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.

B. Joint Filler: Closed cell polyethylene; oversized 50 percent to joint width; self expanding; by maximum lengths available.

C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.07 MORTAR AND GROUT MIXING

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. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, to ensure that mortar color is consistent.

B. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
   1. Exterior, non-loadbearing masonry: Type S.
   2. Interior, non-loadbearing masonry: Type N.

C. New Mortar for Old Brick: Proportion by volume only; no more than 20 percent of the total volume of Portland cement and lime combined to be Portland cement.
   1. Sand: Match original mortar as closely as possible in color, size, and texture, without use of other additives.
   2. Repointing Mortar: Use proportions from 1 part lime to 2 parts sand with no Portland cement, up to 2 parts Portland cement to 3 parts lime to 6 parts sand.

D. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

E. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.

F. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

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. Direct and coordinate placement of metal anchors supplied for installation under other sections.

C. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

B. 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.
   1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

C. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
   1. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

3.04 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.
   3. Mortar Joints: Concave.

D. Brick Units:
   1. Bond: Running.
   2. Coursing: Three units and three mortar joints to equal 8 inches.
   3. Mortar Joints: Concave.

3.05 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.

F. Interlock intersections and external corners.

G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

I. Isolate masonry partitions from vertical structural framing members with a control joint.

J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

K. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.

3.06 REINFORCEMENT AND ANCHORAGE - GENERAL AND SINGLE WYTHE MASONRY

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

3.07 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 8 inches, minimum, to form watertight pan at non-masonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Seal lapped ends and penetrations of flashing before covering with mortar.
   4. At masonry-veneer walls, extend flashing from exterior face of veneer, through veneer, up face of sheathing at least 8 inches, and behind air-infiltration barrier or building paper.
   5. Install metal drip edges beneath flashing at exterior face of wall. Stop flashing 1/2 inch back from outside face of wall and adhere flashing to top of metal drip edge.
   6. Where no metal drip edge is shown, cut flashing off flush with face of wall after masonry wall construction is completed.

B. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.

C. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.08 LINTELS

A. Install steel lintels where indicated.

B. Maintain minimum 8 inch bearing on each side of opening.

3.09 GROUTED COMPONENTS

A. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.10 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
   1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

E. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

F. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

G. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
   1. Install compressible filler in joint between top of partition and underside of structure above.
   2. At fire-rated partitions, install firestopping in joint between top of partition and underside of structure.

3.11 TOLERANCES

A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

E. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.12 CUTTING AND FITTING

A. Cut and fit for chases, pipes, conduit, sleeves, and ductwork. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 CLEANING

A. Remove excess mortar and mortar droppings.

B. 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.

C. 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.

D. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

E. 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. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-02 applicable to type of stain on exposed surfaces.

F. Clean soiled surfaces with cleaning solution.

G. Use non-metallic tools in cleaning operations.

3.14 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

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DIVISION 05



METALS

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SECTION 05 5000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items.

B. Steel lintels and support angles.

1.02 RELATED REQUIREMENTS

A. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

C. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172.

D. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic).

1.04 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A 36/A 36M.

B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type II - Organic, complying with VOC limitations of authorities having jurisdiction.

2.02 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. 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.

D. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

A. Lintels: As detailed; galvanized finish.

2.04 FINISHES - STEEL

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 2.0 oz/sq ft galvanized coating.

C. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.05 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

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Obtain approval prior to site cutting or making adjustments not scheduled.

C. After erection, prime welds, abrasions, and surfaces not galvanized .

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

DIVISION 06



WOODS, PLASTICS & COMPOSITES

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SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof-mounted curbs.

B. Miscellaneous wood nailers, furring, and grounds.

1.02 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. AWPA U1 - Use Category System: User Specification for Treated Wood.

E. PS 1 - Structural Plywood.

F. PS 2 - Performance Standard for Wood Structural Panels.

G. PS 20 - American Softwood Lumber Standard.

1.03 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
   2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
   3. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: Nominal sizes as indicated on drawings, S4S.
   1. Wood Framing:
      a. Wood framing, size as required for condition, see drawings.
   2. Stud Sizes:
      a. Stud sizes, size as required for condition, see drawings.

B. Moisture Content: S-dry or MC19.

C. Stud Framing (2 by 2 through 2 by 6):
   1. Species: SPF or Hem-Fir.
   2. Grade: No. 2.

D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Sizes:
      a. Wood blocking, size as required for condition, see drawings.
   2. Lumber: S4S, No. 2 or Standard Grade.
   3. Boards: Standard or No. 3.

E. Concealed Framing:

1. Spruce-pine-fir (south) or spruce-pine-fir, Standard or 3 Common grade.

2.03 CONSTRUCTION PANELS

A. Roof Sheathing: PS 2 type, rated Structural I Sheathing.
   1. Construction Panel: 3/4 inch (19 mm) CDX plywood.
   2. Bond Classification: Exposure 1.
   3. Performance Category: 3/4 PERF CAT.

B. Communications and Electrical Room Mounting Boards WD-SHTG-12: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.04 ACCESSORIES

A. Metal and Finish of Fasteners:
   1. Untreated Wood: Unfinished steel.

B. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

C. Wood Shims.

2.05 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
   1. Treat lumber in contact with masonry or concrete.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

C. Provide nonstructural framing and blocking to support the following:
   1. Cabinets and shelf supports.
   2. Wall brackets.
   3. Other wall- or ceiling-mounted items indicated on drawings.

3.03 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at each roof opening except where specifically indicated otherwise; form corners by alternating lapping side members.

C. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. NES NER-272 for power-driven fasteners.
   2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

E. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.04 INSTALLATION OF CONSTRUCTION PANELS

A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
   1. At long edges use sheathing clips where joints occur between roof framing members.
   2. Nail panels to framing; staples are not permitted.

B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.
   4. Size: 48 by 96 inches, installed horizontally at ceiling height.

C. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

D. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.05 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.06 CLEANING

A. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.

B. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

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SECTION 06 4100
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated cabinet units.

B. Countertops.

C. Hardware.

D. Factory finishing.

1.02 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition.

C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition.

D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards.

E. BHMA A156.9 - Cabinet Hardware.

F. ISFA 2-01 - Classification and Standards for Solid Surfacing Material.

G. NEMA LD 3 - High-Pressure Decorative Laminates.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

C. Product Data: Provide data for hardware accessories.

1.04 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

1.06 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design; Kemper Cabinets: www.kempercabinets.com..

B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 CABINETS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Cabinets:

1. Drawer Front: Slab.
2. Door Front: Profiled front.
   a. Style: Kemper, Larsen.

3. Overlay: Full.
4. Shape: Square.
5. Material: Oak.
6. Stain Finish/Color: As selected by Owner from manufacturers full line.
    a. Sheen: Satin.

2.03 LAMINATE MATERIALS

A. Manufacturers:
1. Formica Corporation: www.formica.com/#sle.
2. Panolam Industries International, Inc: www.panolam.com/#sle.
3. Wilsonart LLC: www.wilsonart.com/#sle.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.

C. Provide specific types as indicated.
1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, color as selected.
2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, color as selected, finish as indicated.

2.04 COUNTERTOPS

A. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
    a. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
    b. NSF approved for food contact.
    c. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
    d. Finish: Matte or suede, gloss rating of 5 to 20.
    e. Surface Color and Pattern: As selected by Architect from the manufacturer's full line.
2. Exposed Edge Treatment: Postformed laminate; front edge substrate built up to minimum 1-1/4 inch thick with radiused edge, integral coved backsplash with radiused top edge.

2.05 WINDOW SILLS

A. Solid Surfacing Sills: Solid surfacing sheet or plastic resin casting over continuous substrate.
1. Flat Sheet Thickness: 1/2 inch, minimum.
2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
    a. Manufacturers:
        1) Avonite Surfaces: www.avonitesurfaces.com.
        2) Dupont: www.corian.com.
        3) Formica Corporation: www.formica.com.
        4) Wilsonart: www.wilsonart.com.
        5) Substitutions: See Section 01 6000 - Product Requirements.
    b. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
    c. Color and Pattern: As selected by Architect from manufacturer's full line.

2.06 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

D. Grommets: Standard plastic grommets for cut-outs, in color as selected.

2.07 HARDWARE

A. Cabinet Hardware: Comply with BHMA A156.9 for hardware types indicated below:
   1. A. Hinges:
      a. 1. Concealed 120-degree swing, self-closing, clip-on style.
         1) a. Doors up to 34 inches in height have 2 hinges per door.
         2) b. Doors 35 inches to 62 inches in height have 3 hinges per door.
         3) c. All doors have rubber bumpers.
   2. B. Door and Drawer Pulls:
      a. 1. Mastercraft; Model WE11K1-SN.

B. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated self rests and shelf hold-down clips, satin chrome finish, for nominal 1 inch spacing adjustments.

C. ADA Modesty Panel Bracket: Sloped face bracket.
   1. Materials: Steel angles with matching panel brackets.
   2. Color: White powder coated.
   3. Products:
      a. Wurth Louis and Company; Model: DDLMPB-WH: www.wurthlac.com.

D. Cabinet Catches and Latches:
   1. Type: Magnetic catch.

E. Drawer Slides: BHMA A156.9, cold rolled steel, zinc plated with positive stop and full extension, Rolling steel balls, nylon rollers meeting or exceeding the following requirements, unless otherwise indicated:
   1. Minimum 75 lb, load rating, for use at drawers 16-inches wide or less.
   2. Minimum 100 lb load rating, for use at drawers 24-inches wide or less.
   3. Minimum 150 lb load rating, for use at drawers greater than 24-inches wide at deep drawers, and drawers with file folder rack.
   4. Full Extenstion Drawer Slides: Side-mount, ball bearing type; epoxy coated; not less than 100 lb load rated.
   5. Mounting: Side mounted.
   6. Stops: Integral type.
   7. Features: Provide self closing/stay closed type.

2.08 FABRICATION

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

D. Matching Wood Grain: Comply with requirements of quality standard for specified Grade and as follows:
   1. Provide book matchedpanels at each elevation.

E. Provide cutouts for plumbing fixtures, appliances, outlet boxes, and fixtures and fittings. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

F. Cabinet Box:
   1. Top and Bottom: 3/8” thick furniture board.
   2. Sides: ½” thick furniture board.
   3. Back: 3/8” thick furniture board

G. Cabinet Exterior:
   1. Sides: Matching laminate.
   2. Wall cabinet top/bottom: Natural maple laminate.

3. Back: unfinished.

H. Cabinet Interior: Natural maple laminate.

I. Drawers: Four-sided, dovetailed, clear-coated hardwood with full extension, soft-close.

J. Hinges: Fully concealed, 6-way adjustable cup hinge with soft-close.

K. I-Beam Braces: 3/8” thick furniture board.

L. Adjustable Shelf: ¾” thick furniture board with natural maple laminate and PVC edgebanding.

M. Toekick: Unfinished furniture board; field-applied. Toeboard required.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.

B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

C. Use fixture attachments in concealed locations for wall mounted components.

D. Use concealed joint fasteners to align and secure adjoining cabinet units.

E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

F. Secure cabinets to floor using appropriate angles and anchorages.

G. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

DIVISION 07



THERMAL & MOISTURE PROTECTION

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SECTION 07 2100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation at roof parapets.

B. Insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 REFERENCE STANDARDS

A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.03 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board.

B. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.

C. Insulation Roof parapets: Extruded polystyrene (XPS) board.

2.02 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
   1. Type and Compressive Resistance for under slab: Type IV, 25 psi (173 kPa), minimum.
   2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   4. Type and Thermal Resistance, R-value: Type VI, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
   5. Board Edges: Square.
   6. Products:
      a. DuPont de Nemours, Inc; Styrofoam Brand Square Edge: building.dupont.com/#sle.
      b. Kingspan Insulation LLC; GreenGuard GG25-LG XPS Insulation Board: www.kingspan.com/#sle.
      c. Owens Corning Corporation; FOAMULAR Type IV Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/#sle.
      d. DiversiFoam Products; CertiFoam 25 SE: www.diversifoam.com.
      e. Substitutions: See Section 01 6000 - Product Requirements.

B. Extruded Polystyrene (XPS) Board Insulation for Below Slab: Comply with ASTM C578 with either natural skin or cut cell surfaces.
   1. Type and Compressive Resistance: Type VI, 40 psi (276 kPa), minimum.
   2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
   5. Board Edges: Square.
   6. Products:
      a. DuPont de Nemours, Inc; Styrofoam Brand Square Edge: building.dupont.com/#sle.
      b. Kingspan Insulation LLC; GreenGuard GG40-LG XPS Insulation Board: www.kingspan.com/#sle.

c. Owens Corning Corporation; FOAMULAR 400 High Compressive Strength Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/#sle.
d. DiversiFoam Products; CertiFoam 40: www.diversifoam.com.
e. Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

A. Foamed-in-Place Insulation: Polyurethane type, low expansion for filling window, door and other miscellaneous crevices.

B. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Apply adhesive to back of boards:
1. Three continuous beads per board length.
2. Full bed 1/8 inch thick.

B. Install boards horizontally on foundation perimeter.
1. Place boards to maximize adhesive contact.
2. Install in running bond pattern.
3. Butt edges and ends tightly to adjacent boards and to protrusions.

C. Extend boards over expansion joints, unbonded to foundation on one side of joint.

D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION UNDER CONCRETE SLABS

A. Place insulation under slabs on grade after base for slab has been compacted.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.04 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 2600
VAPOR RETARDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vapor retarders.

1.02 RELATED REQUIREMENTS

A. Section 07 5300 - Elastomeric Membrane Roofing: Vapor retarder installed as part of roofing system.

1.03 DEFINITIONS

A. Vapor Retarder: Airtight barrier made of material that is relatively water vapor impermeable, to degree specified, with seams and joints sealed to adjacent surfaces.

B. Vapor Retarder Class: A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class is defined using Procedure A, Desiccant Method at 73 degrees F and 50 percent Relative Humidity (RH), in accordance with ASTM E96/E96M and ICC (IBC)-2018, as follows:
   1. Class I: 0.1 perm or less.
   2. Class II: Greater than 0.1 perm to 1.0 perm.
   3. Class III: Greater than 1.0 perm to 10 perms.
   4. Vapor Permeable: 5 perms or greater.

1.04 REFERENCE STANDARDS

A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

B. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.

C. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.

D. ICC (IBC)-2018 - International Building Code.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on material characteristics, performance criteria, and limitations.

C. Reports: Manufacturer's report certifying installation methods.

1.06 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.01 VAPOR RETARDERS

A. Vapor Retarder Sheet: Polyethylene sheeting complying with ASTM D4397, clear colored.
   1. Thickness: 10 mil, 0.010 inch, nominal.
   2. Water Vapor Permeance: 0.05 perm, maximum, when tested in accordance with ASTM E96/E96M.
   3. Seam and Perimeter Tape: Polyethylene self-adhering type, mesh reinforced, 2 inches wide; compatible with sheet material.

2.02 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Vapor Retarder and Adjacent Substrates: As indicated, complying with vapor retarder manufacturer's installation instructions.

B. Seam Tape: 3 inch wide, acceptable to manufacturer for commercial applications.

C. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M; slip resistance requirement waived if not installed on roof.
   1. Width: 9 inches.
   2. Composition: Modified bituminous sheet laminated to polyethylene sheet.
   3. Thickness: 60 mil, 0.060 inch, nominal.
   4. Products:
      a. DuPont de Nemours, Inc; DuPont FlexWrap: www.dupont.com/building/#sle.
      b. Dow Chemical Company (The); Weathermate Flexible Flashing: www.building.dow.com..
      c. Substitutions: See Section 01 6000 - Product Requirements.

D. Thinners and Cleaners: As recommended by vapor retarder manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions comply with requirements of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's installation instructions.

B. Vapor Retarders: Install continuous airtight barrier over surfaces indicated, with sealed seams and sealed joints to adjacent surfaces.

C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.

D. Openings and Penetrations in Exterior Vapor Retarders:
   1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches onto vapor retarder and at least 6 inches up jambs; mechanically fasten stretched edges.
   2. At openings with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
   3. At openings with nonflanged frames, seal vapor retarder to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
   4. At head of openings, install flashing under vapor retarder extending at least 2 inches beyond face of jambs; seal vapor retarder to flashing.
   5. At interior face of openings, seal gaps between window/door frame and rough framing using appropriate joint sealant over backer rod.
   6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of vapor retarder.

3.04 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 5300
ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Elastomeric roofing membrane, ballasted conventional application.

B. Insulation, flat and tapered.

C. Vapor retarder.

D. Cover boards.

E. Roofing stack boots and walkway pads.

1.02 REFERENCE STANDARDS

A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

B. ASTM D448 - Standard Classification for Sizes of Aggregate for Road and Bridge Construction.

C. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane.

D. FM (AG) - FM Approval Guide.

E. ICC (IBC) - International Building Code.

F. NRCA ML104 - The NRCA Roofing and Waterproofing Manual.

G. SPRI RP-4 - Wind Design Standard for Ballasted Single-Ply Roofing Systems.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of associated counterflashings installed under other sections.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, and fasteners.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and setting plan for tapered insulation.

D. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

F. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.05 PERFORMANCE REQUIREMENTS

A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

C. Roofing assemblies must be in compliance with an assembly that has been successfully tested by a qualified testing agency to resist the design uplift pressures calculated according to the ICC (IBC).

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience, and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.

B. Store materials in weather protected environment, clear of ground and moisture.

C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

D. Protect foam insulation from direct exposure to sunlight.

1.08 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane when ambient temperature is below 40 degrees F.

C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.09 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
   1. Special warranty includes roofing membrane, base flashings, roof insulation, fasteners, cover boards, walkway products and other components of membrane roofing system.
   2. Special warranty shall include damage caused by peak wind gust speeds of 72 mph or less measured at 10 meters above ground.
   3. Warranty Period: 20 years from date of Substantial Completion.

C. Special Project Warranty: Submit roofing Installer's warranty, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. EPDM Membrane Materials:
   1. Basis of Design: Carlisle SynTec Systems; Sure-Seal EPDM: www.carlisle-syntec.com/#sle.
   2. Other Approved Manufacturers:
      a. Elevate; Low Slope Fire Retardant (LSFR) RubberGard EPDM Membrane: www.holcimelevate.com/#sle.
      b. GenFlex Roofing Systems, LLC: www.genflex.com.
      c. Johns Manville; JM EPDM: www.jm.com/#sle.
      d. Versico Roofing Systems; VersiGard EPDM: www.versico.com/#sle.
      e. Substitutions: See Section 01 6000 - Product Requirements.

B. Insulation:
   1. Dow Chemical Company: www.dow.com.
   2. Atlas Roofing Corporation: www.atlasroofing.com.
   3. Carlisle SynTec Incorporated: www.carlisle-syntec.com.
   4. Elevate: www.holcimelevate.com/#sle.
   5. GAF: www.gaf.com.
   6. GenFlex Roofing Systems: www.genflex.com.
   7. Versico, a division of Carlisle Construction Materials Inc: www.versico.com/#sle.
   8. Substitutions: See Section 01 6000 - Product Requirements.

C. Cover Boards:
   1. Georgia-Pacific; DensDeck Prime Roof Boards with EONIC Technology: www.densdeck.com/#sle.
   2. Versico Roofing System; SecureShield HD Plus: www.versico.com.
   3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ROOFING - BALLASTED APPLICATIONS

A. Elastomeric Membrane Roofing: One-ply membrane loose-laid over insulation with ballast.

B. Acceptable Insulation Types- Under Membrane - Constant Thickness Application: Any of the types specified.
   1. Minimum 2 layers of polyisocyanurate board.

C. Acceptable Insulation Types- Under Membrane - Tapered Application: Any of the types specified.
   1. Uniform thickness polyisocyanurate board covered with tapered polyisocyanurate board.
      a. Fabricate factory-tapered insulation boards to slope 1/4 inch per 12 inches, unless noted otherwise.

D. Ballast: Reuse existing.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); non-reinforced; complying with minimum properties of ASTM D4637.
   1. Thickness: 0.060 inch (60 mil).
   2. Sheet Width: 76 inches, maximum.
      a. Adhered Application: Limit width to 120 inches, maximum, when ambient temperatures are less than 40 degrees F for extended period of time during installation.
   3. Color: Black.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Vapor Retarder: Plastic; compatible with roofing and insulation materials.

D. Flexible Flashing Material: Same material as membrane.
   1. Thickness: 60 mil.

2.04 COVER BOARDS

A. Cover Boards: Faced and with high compressive strength polyisocyanurate (ISO) insulation complying with ASTM C1289.
   1. Classifications:
      a. Type II - Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
         1) Class 2 - faced with coated glass-fiber-mat facers on both major surfaces of core foam.
            (a) Compressive Strength: Grade 1, 109 psi, minimum.
            (b) Thickness: 1/2 inch, maximum.
   2. Board Size: 48 by 48 inches.

2.05 INSULATION

A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
   1. Classifications:
      a. Type II: Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
         1) Class 1 - Faced with glass fiber reinforced cellulosic facers on both major surfaces of the core foam.
         2) Compressive Strength: Classes 1-2-3, Grade 3 - 25 psi (172 kPa), minimum.
         3) Thermal Resistance, R-value: At 1-1/2 inches thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F.
   2. Board Size: 48 by 96 inches.
   3. Board Thickness: 1.5 inch, minimum.
   4. Tapered Board: Slope as indicated; minimum thickness 1/2 inch; fabricate of fewest layers possible.
   5. Board Edges: Square.

2.06 BALLAST MATERIALS

A. Sound, hard, washed rounded river gravel, ASTM D448 Size Classification 3.

2.07 ACCESSORIES

A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

B. Insulation Fasteners: Appropriate for purpose intended.
   1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.

C. Membrane Adhesive: As recommended by membrane manufacturer.

D. Sealants: As recommended by membrane manufacturer.

E. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

F. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 PREPARATION - CONCRETE DECK

A. Verify adjacent precast concrete roof members do not vary more than 1/4 inch in height. Verify grout keys are filled flush.

B. Fill surface honeycomb and variations with latex filler.

3.03 INSTALLATION - INSULATION, UNDER MEMBRANE

A. Install vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
   1. Extend vapor retarder under cant strips and blocking to deck edge.
   2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.

B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.

C. Attachment of Insulation: Mechanically fasten last layer of insulation to deck in accordance with roofing manufacturer's instructions.

D. Cover Boards: Embed cover boards in full bed of adhesive in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.

E. Loose lay each layer of insulation, provide tight joints, tape each seam prior to adding next layer.

F. Lay subsequent layers of insulation with joints staggered minimum 6 inches from joints of preceding layer.

G. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

H. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
   1. Fill gaps exceeding 1/4 inch with insulation.

I. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches.
   1. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

J. Do not apply more insulation than can be covered with membrane in same day.

3.04 INSTALLATION - MEMBRANE

A. Install elastomeric membrane roofing system in accordance with manufacturer's recommendations.

B. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

C. Shingle joints on sloped substrate in direction of drainage.

D. Mechanically fasten or adhere perimeter of roofing membrane according to requirements in ANSI/SPRI RP-4.

E. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

F. At intersections with vertical surfaces:
   1. Extend membrane up a minimum of 8 inches onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to nailing strips.

G. At gravel stops, extend membrane under gravel stop and to the outside face of the wall.

H. Around roof penetrations, seal flanges and flashings with flexible flashing.

I. Coordinate installation of roof drains and sumps and related flashings.

J. Coordinate installation of associated counterflashings installed under other sections.

3.05 INSTALLATION - BALLAST

A. Ballast: Evenly distribute aggregate ballast, and install in accordance with SPRI RP-4.

3.06 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.07 CLEANING

A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.

B. Remove bituminous markings from finished surfaces.

C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.

D. Repair or replace defaced or damaged finishes caused by work of this section.

3.08 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, and exterior penetrations.

B. Sealants for joints within sheet metal fabrications.

1.02 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM A755/A755M - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

E. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free.

F. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free.

G. SMACNA (ASMM) - Architectural Sheet Metal Manual.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Samples: Submit two samples 2 by 2 inch in size illustrating metal finish color.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise indicated.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch thick base metal.

2.02 PREPAINTED, METALLIC-COATED STEEL SHEETS

A. Description: Factory-applied coatings applied to metallic-coated steel sheet substrates prior to fabrication by coil coating; topcoat systems consist of primers and organic topcoats on exposed, top side of sheet; washcoats on bottom, unexposed sheet side.

B. Comply with ASTM A755/A755M.

C. Metallic-Coated Steel Sheet Substrates:
   1. Zinc-Coated, Galvanized, Steel Sheets: Commercial steel sheets, galvanized by hot-dip process; comply with ASTM A653/A653M; coating designation G90.

D. Substrate Preparation for Prefinishing: Clean and prepare substrate surfaces in accordance with coating manufacturer's recommendations for substrate type and application.

E. Primer Coats: Provide basecoat primers in accordance with coating manufacturer's recommendations for substrate type, topcoat, and application.

F. Superior Performance Organic Coating System: Provide thermally cured 70-percent PVDF fluoropolymer systems in accordance with AAMA 2605, tested for weathering for 10 years with 5 delta units maximum of color change.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Form parapet copings with butt seam with backup plate. Seal with sealant.

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.

2.04 ACCESSORIES

A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.

B. Slip Sheet: Rosin-sized sheathing paper.

C. Primer Type: Zinc chromate.

D. Protective Backing Paint: Asphaltic mastic, ASTM D4479 Type I.

E. Concealed Sealants: Non-curing butyl sealant.

F. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; translucent.

G. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

3.03 INSTALLATION

A. Install exposed sheet metal Work that is without excessive oil canning, 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 to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

B. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

C. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA (ASMM) standards. Fill joint with sealant and form metal to completely conceal sealant.

1. Use joint adhesive for nonmoving joints specified not to be soldered.

D. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.
   1. Underlayment: Where installing metal directly on cementitious or wood substrates, install a slip sheet of red-rosin paper and a course of polyethylene underlayment.
   2. Bed flanges of Work in a thick coat of mastic sealant where required for waterproof performance.

E. Equipment Support Flashing: Coordinate equipment support flashing installation with roofing and equipment installation. Weld or seal flashing to equipment support member.

F. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.

G. Apply plastic cement compound between metal flashings and felt flashings.

H. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

I. Seal metal joints watertight.

3.04 SCHEDULE

A. Through-Wall Flashing in Masonry:

B. Coping, Cap, Parapet, Sill and Ledge Flashings:

C. Counterflashings at Roofing Terminations (over roofing base flashings):

D. Counterflashings at Curb-Mounted Roof Items, including skylights and roof hatches:

E. Roofing Penetration Flashings, for Pipes, Structural Steel, and Equipment Supports:

END OF SECTION

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SECTION 07 8400
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 REFERENCE STANDARDS

A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.

C. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus.

D. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed between Rated Wall Assemblies and Nonrated Horizontal Assemblies.

E. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

F. ITS (DIR) - Directory of Listed Products.

G. FM (AG) - FM Approval Guide.

H. UL 1479 - Standard for Fire Tests of Penetration Firestops.

I. UL (FRD) - Fire Resistance Directory.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on product characteristics, performance ratings, and limitations.

C. Manufacturer's qualification statement.

D. Installer's qualification statement.

1.04 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and:
   1. Verification of minimum three years documented experience installing work of this type.

1.05 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Firestopping Manufacturers:
   1. 3M Fire Protection Products: www.3m.com/firestop/#sle.
   2. A/D Fire Protection Systems Inc: www.adfire.com/#sle.

3. Hilti, Inc: www.hilti.com/#sle.
4. Nelson FireStop Products: www.nelsonfirestop.com/#sle.
5. RectorSeal, a CSW Industrials Company: www.rectorseal.com/firestop-solutions/#sle.
6. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

A. Firestopping Materials: Any materials meeting requirements.

B. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.

C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

D. Fire Ratings: Refer to drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.

B. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.

C. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

2.04 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.
   1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.
   2. Fire Ratings: See drawings for required systems and ratings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authorities having jurisdiction.

C. Install labeling required by code.

3.04 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Joint backings and accessories.

1.02 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer.

B. ASTM C834 - Standard Specification for Latex Sealants.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants.

E. ASTM C1311 - Standard Specification for Solvent Release Sealants.

F. NSF 51 - Food Equipment Materials.

G. SCAQMD 1168 - Adhesive and Sealant Applications.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's technical data-sheets for each product to be used; include the following:
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Backing material recommended by sealant manufacturer.
   4. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   5. Substrates the product should not be used on.
   6. Substrates for which use of primer is required.
   7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
   8. Sample product warranty.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

E. Executed warranty.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

C. Field Quality Control Plan:
   1. Visual inspection of entire length of sealant joints.

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.

C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Nonsag Sealants:
1. Bostik Inc: www.bostik-us.com.
2. Dow Corning Corporation: www.dowcorning.com/construction/sle.
3. Pecora Corporation: www.pecora.com.
4. Sherwin-Williams Company: www.sherwin-williams.com.
5. Sika Corporation: www.usa-sika.com.
6. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:
1. Exterior Joints:
   a. Do not seal exterior joints unless indicated on drawings as sealed.
   b. Seal open joints except open joints indicated on drawings as not sealed.
2. Interior Joints:
   a. Do not seal interior joints indicated on drawings as not sealed.
   b. Do not seal gaps and openings in gypsum board and suspended ceilings
   c. Do not seal through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
   d. Seal the following joints:
      1) Joints between door frames and window frames and adjacent construction.
      2) In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, and piping penetrations.
      3) In sound-rated wall and ceiling assemblies, seal joints between wall assemblies and ceiling assemblies; between wall assemblies and other construction; between ceiling assemblies and other construction.
3. Do Not Seal:
   a. Intentional weep holes in masonry.
   b. Joints indicated to be covered with expansion joint cover assemblies.
   c. Joints where sealant is specified to be furnished and installed by manufacturer of product to be sealed.
   d. Joints where sealant installation is specified in other sections.
   e. Joints between suspended ceilings and walls.

2.03 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.

2.04 NONSAG JOINT SEALANTS

A. Type JS-1 - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
1. Color: Clear.
2. Products:
   a. Sika Corporation; Sikasil GP: usa.sika.com/#sle.
   b. Tremco Global Sealants; Tremsil 200: www.tremcosealants.com.
   c. Substitutions: See Section 01 6000 - Product Requirements.

B. Type JS-2 - Liquid Silicone Rubber Sealant: ASTM C920, Grade NS, Use NT; single component, acid-curing, NSF 51 and FDA Regulation No. 21 CFR 177.2600 compliant.
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C2240.
   3. Color: To be selected by Architect from manufacturer's full range.

C. Type JS-3 - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multicomponent; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus and minus 50 percent, minimum.
   2. Hardness Range: , Shore A, when tested in accordance with ASTM C661.
   3. Color: To be selected by Architect from manufacturer's full range.
   4. Service Temperature Range: Minus 40 to 180 degrees F.
   5. Products:
      a. Sika Corporation; Sikaflex-15 LM: usa.sika.com/#sle.
      b. Tremco Commercial Sealants & Waterproofing; Vulkem 116: www.tremcosealants.com/#sle.
      c. Substitutions: See Section 01 6000 - Product Requirements.

D. Type JS-4 - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
   1. Color: To be selected by Architect from manufacturer's full range.
   2. Grade: ASTM C834; Grade 0 Degrees C (32 Degrees F).
   3. Products:
      a. Tremco Commercial Sealants & Waterproofing; Tremflex 834: www.tremcosealants.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

E. Type JS-5 - Non-Curing Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag, non-skinning, non-hardening, non-bleeding; vapor-impermeable; intended for fully concealed applications.
   1. Products:
      a. Tremco Global Sealants; Tremco Butyl Sealant: www.tremcosealants.com.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.05 ACCESSORIES

A. Sealant Backing Materials, General: Materials placed in joint before applying sealants; assists sealant performance and service life by developing optimum sealant profile and preventing three-sided adhesion; type and size recommended by sealant manufacturer for compatibility with sealant, substrate, and application.

B. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

C. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.

D. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in an inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION

A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Provide joint sealant installations complying with ASTM C1193.

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 backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

H. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements for additional requirements.

B. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.05 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width, i.e., at low temperature in thermal cycle. Report failures immediately and repair them.

3.06 SEALANT SCHEDULE

EXTERIOR APPLICATION/LOCATION	SEALANT TYPE
Joints for which no other sealant type is indicated	JS-3
Control, expansion, and soft joints in masonry, and between masonry and adjacent work	JS-3
Lap joints in exterior sheet metal work	JS-5
Coping joints and coping to facade joints	JS-3
Joints between exterior metal frames and adjacent work (except masonry)	JS-3
Under exterior door thresholds	JS-5
Perimeter joints on exterior side of windows, frames, and louvers in walls	JS-3
Electrical and mechanical fixtures	JS-3

INTERIOR APPLICATION/LOCATION	SEALANT TYPE
Joints for which no other sealant type is indicated	JS-4
Concealed control and expansion joints	JS-4
Exposed control joints - Masonry	JS-4

Joints between plumbing fixtures and walls and floors, and between countertops and walls.	JS-1
Joints subject to contact with food	JS-2
Perimeter joints on interior side of windows, frames, and louvers in walls	JS-3
Electrical and mechanical fixtures	JS-4
Heat resistance	JS-1
Heating, Ventilating, Air Conditioning Ducts	JS-1

END OF SECTION

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DIVISION 08



OPENINGS

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SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Hollow metal frames for wood doors.

C. Fire-rated hollow metal frames.

D. Thermally insulated hollow metal doors with frames.

1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware.

B. Section 08 8000 - Glazing: Glass for doors and borrowed lites.

C. Section 09 9000 - Painting and Coating: Field painting.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design.

B. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.

C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors.

D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100).

E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

H. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.

I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

J. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.

K. ASTM C476 - Standard Specification for Grout for Masonry.

L. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

M. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C.

N. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.

O. ICC A117.1 - Accessible and Usable Buildings and Facilities.

P. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames.

Q. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames.

R. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames.

S. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames.

T. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.

B. Maintain at project site copies of reference standards relating to installation of products specified.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Requirements for Hollow Metal Doors and Frames:
   1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
   2. Accessibility: Comply with ICC A117.1 and ADA Standards.
   3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
   4. Door Edge Profile: Manufacturers standard for application indicated.
   5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
   6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
   7. Galvanizing for Units in Wet Areas: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating thickness
      a. Based on NAAMM HMMA Custom Guidelines: Provide at least A25/ZF75 (galvannealed) for interior applications, and at least A60/ZF180 (galvannealed) or G60/Z180 (galvanized) for corrosive locations.
   8. Thermal Performance: Assembly U-Value of 0.370 maximum.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.02 HOLLOW METAL DOORS

A. Exterior Doors: Thermally insulated.
   1. Grade: ANSI/SDI A250.8 (SDI-100); Level 3 - Extra Heavy-Duty, Physical Performance Level A, Model 2 - Seamless.
      a. Level 3 - Extra Heavy-duty.
      b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 2 - Seamless.
      d. Door Face Metal Thickness: 16 gauge, 0.053 inch, minimum.

e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
2. Core: Polyurethane.
3. Door Thickness: 1-3/4 inches, nominal.
4. Door Face Sheets: Flush.
5. Weatherstripping: Refer to Section 08 7100.
6. Door Finish: Factory primed and field finished.
7. Manufacturer:
   a. Ceco Door, an Assa Abloy Group company; Imperial w/ Qmax Thermally Enhanced Core: www.assaabloydss.com/#sle.
   b. Steelcraft; L16 Series, an Allegion brand: www.allegion.com/us.
   c. Substitutions: See Section 01 6000 - Product Requirements.

B. Interior Doors, Non-Fire Rated:
1. Grade: ANSI/SDI A250.8 (SDI-100); Level 2 - Heavy-Duty, Physical Performance Level B, Model 2 - Seamless.
   a. Level 2 - Heavy-duty.
   b. Physical Performance Level B 500 000 cycles; in accordance with ANSI/SDI A250.4.
   c. Model 2 - Seamless.
   d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
   e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Door Thickness: 1-3/4 inches, nominal.
4. Door Face Sheets: Flush.
5. Door Finish: Factory primed and field finished.
6. Manufacturer:
   a. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
   b. Steelcraft; L18 Series, an Allegion brand: www.allegion.com/us.
   c. Substitutions: See Section 01 6000 - Product Requirements.

2.03 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Frame Finish: Factory primed and field finished.

C. Exterior Door Frames: Face welded type, Thermally broken.
1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
2. Frame Metal Thickness: 14 gauge, 0.067 inch, minimum.
3. Weatherstripping: Separate, see Section 08 7100.

D. Interior Door Frames, Non-Fire-Rated: Face welded type.
1. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.

E. Door Frames, Fire-Rated: Face welded type.
1. Fire Rating: Same as door, labeled.
2. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.

F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

G. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

H. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.

I. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.04 FRAME ANCHORS

A. Frame Anchors: ASTM A591/A591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
   1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M, hot-dip galvanized according to ASTM A153/A153M, Class B.

B. Jamb Anchors:
   1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
   2. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

C. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
   1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.05 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

B. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15 mil, 0.015 inch dry film thickness (DFT) per coat; provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.06 ACCESSORIES

A. Glazing: As specified in Section 08 8000.

B. Removable Stops: Formed sheet steel, mitered or butted corners; prepared for countersink style tamper proof screws.

C. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.

D. Silencers: Resilient rubber or vinyl, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

E. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.

G. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

H. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

2.07 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

C. Hollow Metal Doors:
   1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
   2. Glazed Lites: Factory cut openings in doors.

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
   1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
   2. Sidelight Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
   3. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
   4. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
   5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
   6. Jamb Anchors: Provide number and spacing of anchors as follows:
      a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
         1) Two anchors per jamb up to 60 inches high.
         2) Three anchors per jamb from 60 to 90 inches high.
         3) Four anchors per jamb from 90 to 120 inches high.
         4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
      b. Postinstalled Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
   1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
   2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
   3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
   4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated.
   1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
   2. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
   3. Provide loose stops and moldings on inside of hollow metal work.
   4. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Coordinate frame anchor placement with wall construction.
   1. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
      a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
   2. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
   3. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

D. Install door hardware as specified in Section 08 7100.

E. Coordinate installation of electrical connections to electrical hardware items.

F. Touch up damaged factory finishes.

3.04 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08 1416
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush and flush glazed configuration; fire rated and non-rated.

1.02 RELATED REQUIREMENTS

A. Section 08 1113 - Hollow Metal Doors and Frames.

B. Section 08 7100 - Door Hardware.

1.03 REFERENCE STANDARDS

A. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.

B. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives.

C. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.

D. WDMA I.S. 1A - Interior Architectural Wood Flush Doors.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

D. Samples: Submit two samples of door veneer, 4 by 4 inch in size illustrating wood grain, stain color, and sheen.

E. Specimen warranty.

F. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging, and inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Oregon Door: www.oregondoor.com/#sle.
   2. VT Industries, Inc: www.vtindustries.com/#sle.
   3. Oshkosh Door Company; www.oshkoshdoor.com.

4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS

A. All Doors:
   1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with WDMA I.S. 1A.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at each location.
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc. (UL) labeled without any visible seals when door is closed.
   3. Wood veneer facing with factory transparent finish.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type structural composite lumber core (SCLC), plies and faces as indicated.

B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish: Red oak, HPVA Grade A, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
   1. Vertical Edges: Same species as face veneer.
   2. "Running Match" each pair of doors and doors in close proximity to each other.

B. Facing Adhesive: Type II - water resistant.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:

C. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
   1. Provide solid blocking for other throughbolted hardware.

D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
   1. Exception: Doors to be field finished.

F. Provide edge clearances in accordance with the quality standard specified.

2.06 FINISHES - WOOD VENEER DOORS

A. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
   1. Transparent:
      a. System - TR-8, UV Cured Acrylated Polyester/Urethane.
      b. Stain: As selected by Architect.
      c. Sheen: Satin.

B. Seal door top edge with color sealer to match door facing.

2.07 ACCESSORIES

A. Hollow Metal Door Frames: See Section 08 1113.

B. Wood Louvers:
   1. Louver Blade: Chevron louver.

C. Door Hardware: See Section 08 7100.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that 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.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   1. Install fire-rated doors in accordance with NFPA 80 requirements.
   2. Install smoke and draft control doors in accordance with NFPA 105 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Install door louvers plumb and level.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.05 SCHEDULE - SEE DRAWINGS

END OF SECTION

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SECTION 08 4313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

D. Door hardware.

E. Perimeter sealant.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

B. Section 08 7100 - Door Hardware: Hardware items other than specified in this section.

C. Section 08 8000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.

B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document).

C. AAMA 611 - Specification for Anodized Architectural Aluminum.

D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.

E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

G. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

I. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

J. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

K. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

L. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

M. ICC (IECC) - International Energy Conservation Code.

N. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, internal drainage details .

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.09 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after the Date of Substantial Completion.

C. Provide ten year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Approved Manufacturers:
1. EFCO Corporation: www.efcocorp.com.
2. Kawneer North America: www.kawneer.com/#sle.
3. Manko Window Systems, Inc: www.mankowindows.com/#sle.
4. Oldcastle Building Envelope: www.oldcastlebe.com/#sle.
5. Tubelite, Inc: www.tubeliteinc.com/#sle.
6. Wausau Window and Wall Systems: www.wausauwindow.com.
7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

A. Center-Set Style, Thermally-Broken (Exterior):
1. Basis of Design: Kawneer North America; Model 451UT: www.kawneer.com/#sle.
2. Glazing Rabbet: For 1 inch insulating glazing at Thermally-Broken frames.
3. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.

B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of another approved manufacturer.

2.03 BASIS OF DESIGN -- SWINGING DOORS

A. Wide Stile, Insulating Glazing, Thermally-Broken:
1. Basis of Design: Basis of Design: Kawneer; Model Wide Stile 500T: www.kawneer.com.

2. Glazing Rabbet: For 1 inch insulating glazing at Thermally-Broken frames.

B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of another approved manufacturer.

2.04 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Finish:
      a. Factory finish all surfaces that will be exposed in completed assemblies.
      b. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
   2. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   3. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   4. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   5. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   6. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   7. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
   8. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and heel bead of glazing compound.

B. Performance Requirements
   1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
      a. Design Wind Loads: Comply with requirements of applicable code.
      b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
   2. Water Penetration Resistance: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 12 psf.
   3. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.
   4. Condensation Resistance Factor of Framing: 60, minimum, measured in accordance with AAMA 1503.
   5. Overall Assembly U-value Including Fixed Glazing: 0.29 Btu/(hr sq ft deg F), maximum in accordance with current energy code (ICC (IECC)) or the local Authority Having Jurisdiction, whichever is more stringent.
   6. Overall Assembly U-value Including Entrance Door Glazing: 0.63 Btu/(hr sq ft deg F), maximum in accordance with current energy code (ICC (IECC)) or the local Authority Having Jurisdiction, whichever is more stringent.

2.05 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, drainage holes and internal weep drainage system.
   1. Framing members for interior applications need not be thermally broken.
   2. Glazing Stops: Flush.

3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

B. Glazing: See Section 08 8000.

C. Swing Doors: Glazed aluminum.
1. Top Rail: 5 inches wide.
2. Bottom Rail: 10 inches wide.
3. Glazing Stops: Square.
4. Finish: Same as storefront.

2.06 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Sheet Aluminum: ASTM B209/B209M.

C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.

D. Fasteners: Stainless steel.

E. Exposed Flashings: Aluminum sheet, 20 gauge, 0.032 inch minimum thickness; finish to match framing members.

F. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.

G. Sealant for Setting Thresholds: Non-curing butyl type.

H. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

I. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

J. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.07 FINISHES

A. Class I Color Anodized Finish: AAMA 611 Electrolytically deposited colored anodic coating not less than 0.7 mils thick.

B. Color: Medium bronze.

C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.08 HARDWARE

A. For each door, include weatherstripping and sill sweep strip.

B. Door Hardware not listed within this section: See Section 08 7100.

C. Weatherstripping: Wool pile, continuous and replaceable; provide on all exterior doors.

D. Sill Sweep Strips: Resilient seal type, of neoprene; provide on all exterior doors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Install hardware using templates provided.
   1. See Section 08 7100 for hardware installation requirements.

J. Install glass in accordance with Section 08 8000, using glazing method required to achieve performance criteria.

K. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 ADJUSTING

A. Adjust operating hardware for smooth operation.

3.05 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.06 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

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SECTION 08 5113
ALUMINUM WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Extruded aluminum windows with fixed sash, operating sash, and infill panels.

B. Factory glazing.

C. Operating hardware.

D. Insect screens.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Rough opening framing.

B. Section 07 9200 - Joint Sealants: Sealing joints between window frames and adjacent construction.

C. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights.

B. AAMA 611 - Specification for Anodized Architectural Aluminum.

C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

E. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

H. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

I. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions and descriptions of hardware and accessories.

C. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations, and installation requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.07 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F.

B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Manufacturer Warranty: Provide 10 year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units. Complete forms in Owner's name and register with manufacturer.

D. Manufacturer Warranty: Provide 5-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Aluminum Windows Manufacturers:
   1. EFCO, a Pella Company: www.efcocorp.com/sle.
   2. Kawneer Company, Inc.; Model, 8450TL: www.kawneer.com.
   3. Manko Window Systems, Inc: www.mankowindows.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Manufacturer shall be the same for Sections 08 4313 and 08 5113.

2.02 ALUMINUM WINDOWS

A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.
   1. Frame Depth: 3-1/2 inch.
   2. Operable Units: Double weatherstripped.
   3. Provide factory-glazed units.
   4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
   5. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
   6. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
   7. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   8. Thermal Movement: Design to accommodate thermal movement caused by 180 degrees F surface temperature without buckling stress on glass, joint seal failure, damaging loads on structural elements, damaging loads on fasteners, reduction in performance or other detrimental effects.

B. Double-Hung Type:
   1. Construction: Thermally broken.
   2. Provide screens.
   3. Glazing: Refer to Section 08 8000.
   4. Exterior Finish: Class II color anodized.
   5. Interior Finish: Class II color anodized.

2.03 PERFORMANCE REQUIREMENTS

A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:

1. Performance Class (PC): R.

B. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

C. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 12.11 psf.

D. Air Leakage: 0.1 cfm/sq ft maximum leakage per unit area of outside window frame dimension when tested at 1.57 psf pressure difference in accordance with ASTM E283/E283M.

E. Condensation Resistance Factor of Frame: 63, measured in accordance with AAMA 1503.

F. Overall Thermal Transmittance (U-value): 0.36, maximum, including glazing, measured on window sizes required for this project.

2.04 COMPONENTS

A. Insulated Infill Panel:
1. Outer Face: 0.032 inch thick aluminum.
2. Core: Rigid polyurethane insulation core 1 inch thick.
3. Inner Face: 0.032 inch thick aluminum.

B. Insect Screens: Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable hardware allowing screen removal without use of tools.
1. Hardware: Spring loaded steel pins; four per screen unit.
2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's standard mesh.
3. Frame Finish: Same as frame and sash.

C. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to achieve effective weather seal.

D. Fasteners: Stainless steel.

E. Glazing Materials: See Section 08 8000.

F. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

2.05 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H12 or H14 temper.

C. Concealed Steel Items: Profiled to suit mullion sections; galvanized in accordance with ASTM A123/A123M.

2.06 HARDWARE

A. Sash lock: Lever handle with cam lock.

B. Operator: Lever action handle fitted to projecting sash arms with limit stops.

C. Pulls: Manufacturer's standard type.

D. Bottom Rollers: Nylon, adjustable.

E. Limit Stops: Resilient rubber.

2.07 FINISHES

A. Class II Color Anodized Finish: AAMA 611 AA-M12C22A32, integrally colored anodic coating not less than 0.4 mil thick.

B. Finish Color: Medium bronze.

C. Operator and Exposed Hardware: Enameled to color as selected from manufacturer's standard line.

D. Apply one coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings and adjoining water-resistive barrier materials are ready to receive aluminum windows; see Section 07 2500.

3.02 PRIME WINDOW INSTALLATION

A. Install windows in accordance with manufacturer's instructions.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

D. Install sill and sill end angles.

E. Set sill members and sill flashing in continuous bead of sealant.

F. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

G. Install operating hardware not pre-installed by manufacturer.

H. Install glass and infill panels in accordance with requirements; see Section 08 8000.

3.03 TOLERANCES

A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.04 ADJUSTING

A. Adjust hardware for smooth operation and secure weathertight closure.

3.05 CLEANING

A. Remove protective material from factory finished aluminum surfaces.

B. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

SECTION 08 7100
DOOR HARDWARE

PART 1 GENERAL

1.01 CONDITIONS

A. Conditions of the contract (General and Supplementary Conditions) and Division 01 - General Requirements, govern the work of this section.

B. This section includes all material and related service necessary to furnish all finish hardware indicated on the drawings or specified herein.

C. Furnish UL listed hardware for all labeled and 20 min. openings in conformance with the requirements for the class of opening scheduled. Underwriters' requirements shall have precedence over specification where conflicts exist.

D. All work shall be in accordance with all applicable state and local building codes. Code requirements shall have precedence over this specification where conflicts exist.

1.02 WORK INCLUDED

A. This section includes the following:
   1. Furnish door hardware specified herein, listed in the hardware schedule, and/or required by the drawings.
   2. Cylinders for Aluminum Doors
   3. Thresholds and Weather-stripping (Aluminum frame seals to be provided by aluminum door supplier)

B. Where items of hardware are not definitely or correctly specified and are required for the intended service, such omission, error or other discrepancy should be directed to the Architect prior to the bid date for clarification by addendum. Otherwise furnish such items in the type and quantity established by this specification for the appropriate service intended.

1.03 RELATED WORK IN OTHER SECTIONS

A. This section includes coordination with related work in the following sections:
   1. Division 08 Section "Hollow Metal Doors and Frames".
   2. Division 08 Section "Wood Doors"
   3. Division 08 Section "Aluminum Entrances and Storefronts"

1.04 REFERENCE STANDARDS

A. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.

B. NFPA 101 - Life Safety Code.

C. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.

D. DHI - Recommended Locations for Builders' Hardware.

E. UL - Building Material Directory.

F. DHI - Door and Hardware Institute

G. BHMA - Builders Hardware Manufacturers Association

H. ANSI – American National Standards Institute
   1. IBC- International Building Code (as adopted and amended by local building code)

1.05 SUBMITTALS

A. Within ten days after award of contract, submit detailed hardware schedule in quantities as required by Division 01 - General Requirements.

B. Schedule format shall be consistent with recommendations for a vertical format as set forth in the Door & Hardware Institute's (DHI) publication "Sequence and Format for the Hardware Schedule". Hardware sets shall be consolidated to group multiple door openings which share similar hardware requirements. Schedule shall include the following information:
   1. Door number, location, size, handing, and rating.
   2. Door and frame material, handing.
   3. Degree of swing.
   4. Manufacturer
   5. Product name and catalog number
   6. Function, type and style
   7. Size and finish of each item
   8. Mounting heights
   9. Explanation of abbreviations, symbols, etc.
   10. Numerical door index, indicating the hardware set/ group number for each door.

C. When universal-type door closers are to be provided, the schedule shall indicate the application method to be used for installation at each door: (regular arm, parallel arm, or top jamb).

D. The schedule will be prepared under the direct supervision of a certified Architectural Hardware Consultant (AHC), or certified Door Hardware Consultant (DHC) employed by the hardware distributor. The hardware schedule shall be signed and embossed or stamped with the DHI certification seal of the supervising AHC or DHC. The supervising AHC or DHC shall attend any meetings related to the project when requested by the architect.

E. Check the specified hardware for suitability and adaptability to the details and surrounding conditions.

F. Review drawings from related trades as required to verify compatibility with specified hardware. Indicate unsuitable or incompatible items, and proposed substitutions in the hardware schedule.

G. Provide documentation for all hardware to be furnished on labeled fire doors indicating compliance with positive pressure fire testing UL 10C.

H. Furnish manufacturers' catalog data for each item of hardware in quantities as required by Division 01 - General Requirements.

I. Furnish with first submittal, a list of required lead times for all hardware items.

J. After final approved schedule is returned, transmit corrected copies for distribution and field use in quantities as required by Division 01 - General Requirements.

K. Furnish approved hardware schedules, template lists, and pertinent templates as requested by related trades.

L. Furnish necessary diagrams, schematics, voltage and amperage requirements for all electro-mechanical devices or systems as required by related trades. Wiring diagrams shall be opening-specific and include both a riser diagram and point to point diagram showing all wiring terminations.

M. After receipt of approved hardware schedule, Hardware supplier shall initiate a meeting including the owner’s representative to determine keying requirements. Upon completion of initial key meeting, hardware supplier shall prepare a proposed key schedule with symbols and abbreviations as set forth in the door and hardware institute’s publication “Keying Procedures, Systems, and Nomenclature”. Submit copies of owner approved key schedule for review and field use in quantities as required by Division 01 - General Requirements. Wiring diagrams shall be included in final submittals transmitted for distribution of field use.

1.06 QUALITY ASSURANCE

A. Manufacturers and model numbers listed are to establish a standard of function and quality. Similar items by approved manufacturers that are equal in design, function, and quality may be considered for prior approval of the architect, provided the required data and physical samples are submitted for approval as set forth in Division 01 - General Requirements.

B. Where indicated in this specification, products shall be independently certified by ANSI for compliance with relevant ANSI/BHMA standards A156.1 - A156.36 – Standards for Hardware and Specialties. All products shall meet or exceed certification requirements for the respective grade indicated within this specification. Supplier shall provide evidence of certification when requested by the architect.

C. Obtain each type of hardware (hinges, latch & locksets, exit devices, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.

D. All hardware items shall be manufactured no earlier than 6 months prior to delivery to site.

E. Installation of hardware shall be installed or directly supervised and inspected by a skilled installer certified by the manufacturer of locksets, door closers, and exit devices used on the project, or with not less than 3 years' experience in successful completion of projects similar in size and scope.

F. Provide hardware for all labeled fire doors, which complies with positive pressure fire testing UL 10C.

G. Comply with all applicable provisions of the standards referenced within section 1.4 of this specification.

H. Hardware supplier shall participate when requested to meet with the contractor and/or architect to inspect any claim for incorrect or non-functioning materials; following such inspection, the hardware supplier shall provide a written statement documenting the cause and proposed remedy for any unresolved items.

1.07 DELIVERY, STORAGE AND HANDLING

A. Hardware supplier shall deliver hardware to the job site unless otherwise specified.

B. All hardware shall be delivered in manufacturers' original cartons and shall be clearly marked with set and door number.

C. Contractor shall receive all hardware and provide secure and proper protection of all hardware items to avoid delays caused by lost or damaged hardware. Contractor shall report shortages to the Architect and hardware supplier immediately after receiving material at the job site.

D. Coordinate with related trades under the direction of the contractor for delivery of hardware items necessary for factory installation.

1.08 WARRANTY

A. All hardware items shall be warranted against defects in material and workmanship as set forth in Division 01 - General Requirements.

B. Repair, replace, or otherwise correct deficient materials and workmanship without additional cost to owner.

PART 2 PRODUCTS

2.01 FASTENERS

A. All exposed fasteners shall be Phillips head or as otherwise specified and shall match the finish of adjacent hardware. All fasteners exposed to the weather shall be non-ferrous or stainless steel. Furnish correct fasteners to accommodate surrounding conditions.

B. Coordinate required reinforcements for doors and frames. Seek architect approval prior to furnishing through-bolts. Furnish through-bolts as required for materials not readily reinforced.

2.02 BUTT HINGES

A. Acceptable manufacturers and respective catalog numbers:

		Ives	Stanley	Hager	McKinney
1.	Standard Weight, Plain Bearing	5PB1	F179	****	T2714
2.	Standard Weight, Ball Bearing	5BB1	BB179	BB1279	TB2714
3.	Standard Weight, Ball Bearing, Non-Ferrous	5BB1	FBB191	BB1191	TB2314
4.	Heavy Weight, Ball Bearing	5BB1HW	FBB168	BB1168	T4B3786
5.	Heavy Weight, Ball Bearing, Non-Ferrous	5BB1HW	FBB199	BB1199	T4B3386

B. Hinges shall be independently certified by ANSI for compliance with ANSI A156.1 (2006). Hinges shall meet or exceed the following ANSI grade requirements as indicated below:
   1. Standard Weight, Plain Bearing Hinges: Grade 3
   2. Standard Weight, 2 Ball Bearing Hinges: Grade 2
   3. Heavy Weight, 4 Ball Bearing Hinges: Grade 1

C. Unless otherwise specified, furnish the following hinge quantities for each door leaf.
   1. 3 hinges for doors up to 90 inches.
   2. 1 additional hinge for every 30 inches on doors over 90 inches.
   3. 4 hinges for Dutch door applications.

D. Unless otherwise specified, top and bottom hinges shall be located as specified in Division 08 Section "Hollow Metal Doors and Frames". Intermediate hinges shall be located equidistant from others.

E. Unless otherwise specified, furnish hinge weight and type as follows:
   1. Standard-weight plain-bearing hinges or ball-bearing hinges for interior openings up to 36 inches wide without a door closer.
   2. Standard weight ball bearing hinges for interior openings 36 to 40 inches wide without a door closer and for interior openings up to 40 inches wide with a door closer.
   3. Heavyweight, ball bearing hinges for interior openings over 40 inches wide with a door closer and for all interior vestibule doors.
   4. Heavyweight stainless steel ball bearing hinges for all exterior openings unless otherwise listed in groups.
   5. Heavyweight 5” height ball bearing hinges for all doors that have an automatic operator.

F. Unless otherwise specified, furnish hinges for exterior doors, fabricated from brass, bronze, or stainless steel. Unless otherwise specified, hinges for interior doors may be fabricated from steel.

G. Unless otherwise specified, furnish hinges in the following sizes:

1.	5" x 5"	2-1/4" thick doors
2.	4-1/2" x 4-1/2"	1-3/4" thick doors
3.	3-1/2" x 3-1/2"	1-3/8" thick doors

H. Furnish hinges with width to accommodate trim and allow for 180-degree swing.

I. Unless otherwise specified, furnish hinges with flat button tips with non-rising pins. Furnish non-removable pin (NRP) hinges at all reverse-handed doors that are furnished with lockable hardware.

J. Unless otherwise specified, furnish all hinges to template standards.

2.03 LOCKS AND LATCHES

A. Acceptable manufacturers and respective catalog numbers:

		Schlage	Best
1.	Grade 1 Cylindrical	ND Series SPA	9K Series 14D

B. Bored locks shall be independently certified by ANSI for compliance with ANSI A156.2 (2011).

C. Unless otherwise specified, all locks and latches have:
   1. 2-3/4" Backset
   2. 1/2" minimum throw latchbolt
   3. 1" throw deadbolt
   4. ANSI A115.2 strikes

D. Provide guarded latch bolts for all locksets and latch bolts with throw to maintain fire rating of both single and paired door assemblies.

E. Provide strike with lip length adequate to clear surrounding trim.

F. Provide wrought boxes for strikes at inactive doors, wood frames, and metal frames without integral mortar covers.

G. Provide temperature control modules for electrified locks to limit transfer of heat to door lever.

2.04 CLOSERS

A. Acceptable manufacturers and respective catalog numbers:

	LCN	Norton
1.	4050A / 4050A EDA	R7500 / PR7500

B. Door closers shall be independently certified by ANSI for compliance with ANSI A156.4, Grade 1 (2013).

C. Obtain door closers from a single manufacturer, although several may be indicated as offering products complying with requirements.

D. Provide extra heavy-duty arm (EDA / HD) when closer is to be installed using parallel arm mounting.

E. Hardware supplier shall coordinate with related trades to ensure aluminum frame profiles will accommodate specified door closers.

F. Closers shall use aluminum cylinders.

G. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UL 10C.

H. Unless otherwise specified, all door closers shall have full covers and separate adjusting valves for sweeps, latch, and backcheck.

I. Provide closers for all labeled doors. Provide closer series and type consistent with other closers for similar doors specified elsewhere on the project.

J. Provide closers with adjustable spring power. Size closers to ensure exterior and fire rated doors will consistently close and latch doors under existing conditions. Size all other door closers to allow for reduced opening force not to exceed 5 lbs.

K. Install closers on the room side of corridor doors, stair side of stairways and interior side of exterior doors.

L. Closers shall be furnished with all mounting brackets and cover plates as required by door and frame conditions and by adjacent hardware.

M. Door closers shall be provided with a powder-coat finish to provide superior protection against the effects of weathering. Powder coat finish shall successfully pass a 100-hour salt spray test.

2.05 KICK PLATES AND MOP PLATES

A. Furnish protective plates as specified in hardware groups.

B. Where specified, provide 10" kick plates, 34" armor plates, and 4" mop plates. Unless otherwise specified, metal protective plates shall be .050" thick; plastic plates shall be 1/8" thick.

C. Protective plates shall be 2" less door width, or 1" less door width at pairs. All protective plates shall be beveled on 4 sides and counter-sunk.

D. Protection plates over 16" shall not be provided for labeled doors unless specifically approved by door manufacturers listing. When protection plates over 16” are provided for labeled doors, the plate shall be labeled.

E. Where specified, provide surface mounted door edges. Edges shall butt to protective plates. Provide edges with cutouts as required adjacent hardware.

F. Adjust dimensions of protection plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, protection plates shall be factory drilled for cylinders or other mortised hardware.

2.06 WALL STOPS

A. Acceptable manufacturers and respective catalog numbers:

		Ives	Hager	Burns

1.	Wrought Convex Wall Stop	WS406CVX	232W	570
2.	Wrought Concave Wall Stop	WS406CCV	236W	575

B. Furnish a stop or holder for all doors.

C. Provide concave style wall stop at all adjacent integral push button locks; provide convex style wall stop at all other locations.

D. Where wall stops are not applicable, furnish overhead stops.

E. Furnish floor stops only where specified in hardware sets.

F. Do not provide holder function for labeled doors.

2.07 WEATHERSTRIP, GASKETING

A. Acceptable manufacturers and respective catalog numbers:

		Zero	Pemko	NGP	Reese
1.	Weatherstrip	429	2891_PK	700NA	755
2.	Adhesive Gasket	188	S88	5050	797
3.	Sweep (Brush)	8192	18061_NB	B606	964
4.	Sweep (Neoprene)	39	315_N	200N	323
5.	Sweep w/ drip	8198	345_N	C627	354
6.	Drip Cap	142	346	16	R201

B. Weatherstrip and gasketing shall be independently certified by ANSI for compliance with ANSI A156.22 (2005).

C. Where specified in the hardware groups, furnish the above products unless otherwise detailed in groups.

D. Provide weatherstripping all exterior doors and where specified in hardware sets.

E. Provide intumescent and other required edge sealing systems as required by individual fire door listings to comply with positive pressure standards UL 10C.

F. Provide Zero 188 smoke gaskets at all fire rated doors and smoke and draft control assemblies.

G. Provide gasketing for all meeting edges on pairs of fire doors. Gasketing shall be compatible with astragal design provided by door supplier as required for specific fire door listings.

2.08 THRESHOLDS

A. Acceptable manufacturers and respective catalog numbers:

		Zero	Pemko	NGP	Reese
1.	Saddle Threshold	8655	171	425	S205
2.	Half Saddle Threshold	1675	****	325	S245
3.	Saddle Threshold (Inswing)	653	169	****	****
4.	Saddle Threshold (Interior)	63	151	411	S263

B. Thresholds shall be independently certified by ANSI for compliance with ANSI A156.21 (2001).

C. Hardware supplier shall verify finish floor conditions and provide proper threshold as required to provide a smooth transition between finished floor surfaces.

D. Unless otherwise specified or detailed, provide threshold as follows:
1. Provide Zero 8655 or similar saddle threshold for exterior openings with finished floor height transition of ¼” or less.
2. Provide Zero 1675 or similar half-saddle threshold for exterior openings with finished floor height transition of ¼” to ½”.
3. Provide Zero 653 or similar narrow saddle threshold for exterior doors that swing into the building.

4. Provide Zero 63 or similar low-rise saddle threshold for interior openings when specified with a door sweep or automatic door bottom.

2.09 FINISHES AND BASE MATERIALS

A. Unless otherwise indicated in the hardware groups or herein, hardware finishes shall be applied over base metals as specified in the following finish schedule:

	HARDWARE ITEM	BHMA FINISH
1.	Butt Hinges: Exterior, or Non-Ferrous	630 (US32D - Satin Stainless Steel)
2.	Butt Hinges: Interior	652 (US26D - Satin Chromium)
3.	Locks and Latches	626 (US26D - Satin Chromium)
4.	Pulls and Push Plates/Bars	630 (US32D - Satin Stainless Steel)
5.	Closers	689 (Powder Coat Aluminum)
6.	Protective Plates	630 (US32D - Satin Stainless Steel)
7.	Overhead Stops	630 (US32D - Satin Stainless Steel)
8.	Wall Stops	630 (US32D - Satin Stainless Steel)
9.	Thresholds	719 (Mill Aluminum)
10.	Weather-strip, Sweeps Drip Caps	Aluminum Anodized
11.	Miscellaneous	626 (US26D - Satin Chromium)

2.10 KEYING

A. Provide all cylinders in keyways as required to accommodate owners existing key system.

B. All locks under this section shall be keyed as directed by the owner to an existing Master Key System.

C. Furnish a total of 2 keys per cylinder. Actual cut keys to be determined by owner.

D. Master keys, control keys, and change keys shall be delivered by registered mail to the owner. Construction keys shall be delivered to the contractor.

PART 3 EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, installer shall examine door frame installation to ensure frames have been set square and plumb. Installer shall examine doors, door frames, and adjacent wall, floor, and ceiling for conditions, which would adversely affect proper operation and function of door assemblies. Do not proceed with hardware installation until such deficiencies have been corrected.

3.02 INSTALLATION

A. Before hardware installation, general contractor/construction manager shall coordinate a hardware installation seminar with a 1 week notice to all parties involved. The seminar is to be conducted on the installation of hardware, specifically of locksets, closers, exit devices, continuous hinges and overhead stops. Manufacturer's representative of the above products to present seminar. Seminar to be held at the job site and attended by installers of hardware (including low voltage hardware) for aluminum, hollow metal and wood doors. Training to include use of installation manuals, hardware schedule, templates and physical products samples.

B. Provide blocking or reinforcement for all hardware mounted to drywall construction, including wall mounted door stops and holders.

C. Shim doors as required to maintain proper operating clearance between door and frame.

D. Install all hardware in accordance with the approved hardware schedule and manufacturer's instructions for installation and adjustment.

E. Set units level, plumb and true to the line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

F. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accord with industry standards.

G. Drill appropriate size pilot holes for all hardware attached to wood doors and frames.

H. Unless otherwise specified, locate all hardware in accordance with the recommended locations for builders hardware for standard doors and frames as published by the Door and Hardware Institute.

I. Use only fasteners supplied by or approved by the manufacturer for each respective item of hardware.

J. Conceal push and pull bar fasteners where possible. Do not install through bolts through push plates.

K. Install hardware on UL labeled openings in accordance with manufacturer's requirements to maintain the label.

L. Apply self-adhesive gasketing on frame stop at head & latch side and on rabbet of frame at hinge side.

M. Install hardware in accordance with supplemental "S" label instructions on all fire rated openings.

N. Install wall stops to contact lever handles or pulls. Do not mount wall stops on casework, or equipment.

O. Where necessary, adjust doors and hardware as required to eliminate binding between strike and latchbolt. Doors should not rattle.

P. Overhead stops used in conjunction with electrified hold open closers shall be templated and installed to coincide with engagement of closer hold open position.

Q. Install door closers on corridor side of lobby doors, room side of corridor doors, and stair side of stairways.

R. Adjust spring power of door closers to the minimum force required to ensure exterior and fire rated doors will consistently close and latch doors under existing conditions. Adjust all other door closers to ensure opening force does not exceed 5 lbs.

S. Adjust "sweep", "latch", & "back check" valves on all door closers to properly control door throughout the opening and closing cycle. Adjust total closing speed as required to comply with all applicable state and local building codes.

T. Install "hardware compatible" (bar stock) type weatherstripping continuously for an uninterrupted seal. Adjust templating for parallel-arm door closers, exit devices, etc., as required to accommodate weatherstripping.

U. Unless otherwise specified or detailed, install thresholds with the bevel in vertical alignment with the outside door face. Notch and closely fit thresholds to frame profile. Set thresholds in full bed of sealant.

V. Compress sweep during installation as recommended by sweep manufacturer to facilitate a water-resistant seal.

W. Deliver to the owner one complete set of installation and adjustment instructions, and tools as furnished with the hardware.

3.03 ADJUSTMENT AND CLEANING

A. At final completion, and when H.V.A.C. equipment is in operation, installer shall make final adjustments to and verify proper operation of all door closers and other items of hardware. Lubricate moving parts with type lubrication recommended by the manufacturer.

B. All hardware shall be left clean and in good operation. Hardware found to be disfigured, defective, or inoperative shall be repaired or replaced.

3.04 HARDWARE SCHEDULE

A. The following schedule of hardware groups is intended to describe opening function. The hardware supplier is cautioned to refer to the preamble of this specification for a complete description of all materials and services to be furnished under this section.

HW SET: 01

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PASSAGE SET	ND10S	SCH
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	PERIMETER SEAL	188S	ZER

FUNCTION: (F75) PASSAGE LATCH. LATCH RETRACTED BY LEVER EITHER SIDE. BOTH LEVERS ALWAYS UNLOCKED.

HW SET: 02

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	PASSAGE SET	ND10S	SCH
1	EA	SURFACE CLOSER	4050A SCUSH	LCN
1	EA	THRESHOLD	AS REQUIRED	ZER
	EA	REMAINING HARDWARE	EXISTING	

FUNCTION: (F75) PASSAGE LATCH. LATCH RETRACTED BY LEVER EITHER SIDE. BOTH LEVERS ALWAYS UNLOCKED.

HW SET: 03

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	PASSAGE SET	ND10S	SCH
1	EA	WALL STOP	WS406	IVE
	EA	REMAINING HARDWARE	EXISTING	

FUNCTION: (F75) PASSAGE LATCH. LATCH RETRACTED BY LEVER EITHER SIDE. BOTH LEVERS ALWAYS UNLOCKED.

HW SET: 04

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	EXIT X BLANK OUTSIDE	ND25	SCH
1	EA	LOCK GUARD	LG10	IVE
1	EA	SURFACE CLOSER	4050A SCUSH	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	RAIN DRIP	142	ZER
1	SET	GASKETING	429 (MOUNT PRIOR TO CLOSER)	ZER
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER

FUNCTION: EXIT LOCK. NO OUTSIDE TRIM. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 05

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PRIVACY LOCK	ND40	SCH
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	WALL STOP	WS406	IVE

FUNCTION: (F76) PRIVACY LOCK. OUTSIDE LEVER LOCKED BY INSIDE BUTTON. OUTSIDE LEVER UNLOCKED BY INSIDE LEVER, OUTSIDE EMERGENCY BUTTON, OR CLOSING DOOR. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 06

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PRIVACY LOCK	ND40	SCH
1	EA	SURFACE CLOSER	4050A / 4050A HCUSH	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	PERIMETER SEAL	188S	ZER
1	EA	DOOR BOTTOM	369AA	ZER

FUNCTION: (F76) PRIVACY LOCK. OUTSIDE LEVER LOCKED BY INSIDE BUTTON. OUTSIDE LEVER UNLOCKED BY INSIDE LEVER, OUTSIDE EMERGENCY BUTTON, OR CLOSING DOOR. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 07

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PRIVACY LOCK	ND40	SCH
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	PERIMETER SEAL	188S	ZER
1	EA	DOOR BOTTOM	369AA	ZER

FUNCTION: (F76) PRIVACY LOCK. OUTSIDE LEVER LOCKED BY INSIDE BUTTON. OUTSIDE LEVER UNLOCKED BY INSIDE LEVER, OUTSIDE EMERGENCY BUTTON, OR CLOSING DOOR. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 08

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	PRIVACY LOCK	ND40	SCH
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE
	EA	REMAINING HARDWARE	EXISTING	

FUNCTION: (F76) PRIVACY LOCK. OUTSIDE LEVER LOCKED BY INSIDE BUTTON. OUTSIDE LEVER UNLOCKED BY INSIDE LEVER, OUTSIDE EMERGENCY BUTTON, OR CLOSING DOOR. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 09

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	DEADLATCH	4900	ADA
1	EA	CYLINDER	AS REQUIRED	
1	EA	LOCK GUARD	LG10	IVE
1	EA	CYLINDER GUARD	MS4043	ADA
1	EA	LATCH PADDLE	4590	ADA

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	PUSH/PULL BAR	9190 10"	IVE
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4050 EDA	LCN
1	EA	RAIN DRIP	142	ZER
1	SET	WEATHERSTRIP	BY DOOR SUPPLIER	
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	AS REQUIRED	ZER

FUNCTION: DEADLATCH. LATCH RETRACTED BY KEY. REVERSE KEY TURN RETAINS LATCH FOR PUSH/PULL OPERATION . INSIDE PADDLE RETRACTS LATCH FOR EGRESS AT ALL TIMES.

HW SET: 10

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HARDWARE	BY DOOR SUPPLIER	B/O

HW SET: 11

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	ELEC CLASSROOM LOCK	CO-100-CY-70-KP	SCE
1	EA	SURFACE CLOSER	4050 EDA	LCN
1	EA	RAIN DRIP	142	ZER
1	SET	WEATHERSTRIP	BY DOOR SUPPLIER	
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	AS REQUIRED	ZER

FUNCTION: WIRELESS KEYPAD LOCK. LATCH RETRACTED BY KEY. OUTSIDE LEVER UNLOCKED BY PIN. INSIDE LEVER ALWAYS UNLOCKED FOR EGRESS. UPON LOSS OF POWER, OUTSIDE LEVER REMAINS LOCKED.

HW SET: 12

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	REMAINING HARDWARE	EXISTING	

NO WORK - ALL EXISTING HARDWARE TO REMAIN.

END OF SECTION

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SECTION 08 8000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Insulating glass units.

B. Glazing compounds.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealants for other than glazing purposes.

B. Section 08 4313 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.

C. Section 08 5113 - Aluminum Windows: Glazing provided as part of the window assembly.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

F. ASTM C1036 - Standard Specification for Flat Glass.

G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.

H. ASTM C1193 - Standard Guide for Use of Joint Sealants.

I. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.

J. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.

K. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.

L. GANA (SM) - GANA Sealant Manual.

M. ICC (IECC) - International Energy Conservation Code.

N. NFRC 100 - Procedure for Determining Fenestration Product U-factors.

O. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

P. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Samples: Submit two samples 12 by 12 inch in size of glass units.

D. Test Reports: Indicate compliance of glazing assembly meets or exceed specified requirements.

E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM), and IGMA TM-3000 for glazing installation methods.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.06 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Design Pressure: Calculated in accordance with ASCE 7.
   2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
   3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
   4. Glass thicknesses listed are minimum.

B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
   1. In conjunction with weather barrier related materials described in other sections, as follows:

C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
   1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 7 computer program.
   2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 7 computer program.
   3. Solar Optical Properties: Comply with NFRC 300 test method.
   4. Coordinate glass U-value with required thermal performance of assembly U-value; See section(s), 08 4313 and current energy code (ICC (IECC)) or the local Authority Having Jurisdiction, whichever is more stringent.

2.02 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.
   1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
   2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
   3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
   4. Impact Resistant Safety Glass: Complies with ANSI Z97.1 - Class B, or 16 CFR 1201 - Category I criteria.
   5. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

2.03 INSULATING GLASS UNITS

A. Insulating Glass Units: Types as indicated.
   1. Durability: Certified by an independent testing agency to comply with ASTM E2190.

2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) type coatings on flat glass; coated vision glass, Kind CV; Kind CO; or coated spandrel glass, Kind CS.
3. Warm-Edge Spacers: Flexible silicone with polyisobutylene (PIB) primary seal.
   a. Spacer Width: As required for specified insulating glass unit.
4. Spacer Color: Black.
5. Edge Seal:
6. Color: Black.
7. Purge interpane space with dry air, hermetically sealed.

B. Type GL-1 -Insulating Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
2. Space between lites filled with argon.
3. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.
   b. Low-E Coating: Vitro Architectural Glass (formerly PPG Glass) Solarban 60, on #2 surface.
4. Warm-edge spacer.
5. Inboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.
   b. Coating: Pilkington Energy Advantage, on #4 surface.
6. Total Thickness: 1 inch.
7. Thermal Transmittance (U-Value), Assembly: 0.29, maximum.
8. Visible Light Transmittance (VLT): 70 percent, nominal.
9. Solar Heat Gain Coefficient (SHGC): 0.40, assembled maximum.
10. Visible Light Reflectance, Outside: 11 percent, nominal.
11. Glazing Method: Wet glazing method, sealant and sealant.

2.04 GLAZING COMPOUNDS

A. Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.

B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

2.05 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option I; color black.

D. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that the minimum required face and edge clearances are being provided.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

D. Verify that sealing between joints of glass framing members has been completed effectively.

E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, and paint.

3.04 INSTALLATION - WET GLAZING METHOD (SEALANT AND SEALANT)

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Place setting blocks at 1/4 points and install glazing pane or unit.

C. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.

D. Fill gaps between glazing and stops with JS-3 type sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.

E. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.05 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove nonpermanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.06 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 08 8300
MIRRORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass mirrors.

1.02 REFERENCE STANDARDS

A. ASTM C1036 - Standard Specification for Flat Glass.

B. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror.

C. GANA (GM) - GANA Glazing Manual.

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM) for glazing installation methods.

B. Fabricate, store, transport, receive, install, and clean mirrors in accordance with manufacturer's recommendations.

1.04 FIELD CONDITIONS

A. Do not install mirrors when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

PART 2 PRODUCTS

2.01 MATERIALS

A. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.

B. Mirror Glass; Type MIR-1 & MIR-2: ASTM C1036, Type 1 - Transparent Flat, Class 1 - Clear, Quality - Q1 (high-quality mirrors); silvering, protective coating, and quality requirements in compliance with ASTM C1503.
   1. Thickness: 1/4 inch.
   2. Size: As indicated on drawings.
   3. Frame:
      a. MIR-1: Frameless.

2.02 ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness.

C. Glazing Tape: Preformed butyl compound; 10 to 15 Shore A durometer hardness; on release paper.

D. Mirror Attachment Accessories: Stainless steel clips.

E. Channel Frame: One piece, channel frame, stainless steel, Type 430, satin finish, 1/2 inch by 1/2 inch by 3/8 inch deep with 90 degree mitered corners.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces of mirror frames or recesses are clean, free of obstructions, and ready for installation of mirrors.

3.02 INSTALLATION

A. Install mirrors in accordance with manufacturer's recommendations.

B. Set mirrors plumb and level, and free of optical distortion.

C. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes.

D. Installation in Frames:
   1. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.
   2. Place setting blocks at one-quarter points with edge block no more than 6 inches from corners.
   3. Rest mirrors on setting blocks and push against tape to ensure full contact at perimeter of mirror.
   4. Install removable stops, insert spacer shims between mirrors, and apply stops at 24 inches on center and at 1/4 inch below sight line.
   5. Fill gaps between mirror and applied stop with sealant to depth equal to bite on glazing, to uniform and level line.
   6. Trim protruding tape edge.

E. Frameless Mirrors: Set mirrors with clips, and anchor rigidly to wall construction.

3.03 CLEANING

A. Remove wet glazing materials from finish surfaces.

B. Remove labels after work is complete.

C. Clean mirrors and adjacent surfaces.

END OF SECTION

DIVISION 09



FINISHES

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SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal stud wall framing.

B. Gypsum wallboard.

C. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members.

B. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing.

C. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

E. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.

F. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.

G. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

H. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.

I. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

J. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

K. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.

L. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

M. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

N. ASTM C1396/C1396M - Standard Specification for Gypsum Board.

O. GA-216 - Application and Finishing of Gypsum Panel Products.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the installation of gypsum board assemblies with size, location, and installation of service utilities.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.

B. Store metal products to prevent corrosion.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
   1. See PART 3 for finishing requirements.

2.02 METAL FRAMING MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.

B. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
   2. Marino: www.marinoware.com.
   3. Phillips Manufacturing Co: www.phillipsmfg.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

C. Nonstructural Framing System Components: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
   1. Protective Coating: ASTM A653/A653M, G60 (Z180), hot-dip galvanized, unless otherwise indicated.
   2. Studs: C-shaped with knurled or embossed faces.
      a. Minimum Base-Metal Thickness: 0.0312 inch.
      b. Any locations supportings wall supported items shall be 20 ga. minimum.
   3. Runners: U shaped, sized to match studs.
      a. Minimum Base-Metal Thickness: 0.0312 inch.
      b. Any locations supportings wall supported items shall be 20 ga. minimum.

D. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection and prevent rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.
   2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.
   3. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems specified in this section.
   4. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-resistance rating of the wall assembly.
      a. Products:
         1) FireTrak Corporation; Posi Klip: www.fire-trak.com/#sle.
         2) Metal-Lite, Inc; The System: www.metal-lite.net/#sle.
         3) Substitutions: See Section 01 6000 - Product Requirements.
   5. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. CertainTeed Corporation: www.certainteed.com/#sle.
   2. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
   3. National Gypsum Company: www.nationalgypsum.com/#sle.
   4. USG Corporation: www.usg.com/#sle.
   5. Substitutions: See Section 01 6000 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces, unless otherwise indicated.
   2. Thickness:

a. Vertical Surfaces GYP BD-1: 5/8 inch.

3. Paper-Faced Products:
   a. CertainTeed Corporation; ProRoc Brand Gypsum Board.
   b. Georgia-Pacific Gypsum; ToughRock: www.gpgypsum.com/#sle.
   c. National Gypsum Company; Gold Bond Brand Gypsum Wallboard.
   d. USG Corporation; Sheetrock Brand Gypsum Panels.
   e. Substitutions: See Section 01 6000 - Product Requirements.

2.04 GYPSUM BOARD ACCESSORIES

A. Finishing Accessories: ASTM C1047, galvanized steel sheet ASTM A924/A924M G90, unless noted otherwise.
   1. Types: As detailed or required for finished appearance.
   2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.

B. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
   2. Ready-mixed vinyl-based joint compound.
      a. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
      b. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
      c. Fill Coat: For second coat, use setting-type, sandable topping compound.
      d. Finish Coat: For third coat, use setting-type, sandable topping compound.

C. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

D. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

E. Isolation Strip at Exterior Walls: Provide the following:
   1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C1007AISI S220 and manufacturer's instructions.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Studs: Space studs at 16 inches on center.
   1. Extend partition framing to structure in all locations. Continue framing around ducts penetrating partitions above ceiling.
   2. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

D. Blocking: Install wood blocking for support of:
   1. Framed openings.
   2. Wall-mounted cabinets.
   3. Plumbing fixtures.

3.03 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
   1. Exception: Tapered edges to receive joint treatment at right angles to framing.

C. Installation on Metal Framing: Use screws for attachment of gypsum board.

D. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
   2. At exterior soffits, not more than 30 feet apart in both directions.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.05 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   2. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   3. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
   4. Level 0: Temporary partitions.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.
   2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
   3. Taping, filling, and sanding are not required at base layer of double-layer applications.

3.06 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.07 PROTECTION

A. Protect installed gypsum board assemblies from subsequent construction operations.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 5100
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.02 RELATED REQUIREMENTS

A. Section 23 3700 - Air Outlets and Inlets: Air diffusion devices in ceiling.

B. Section 26 5100 - Interior Lighting: Light fixtures in ceiling system.

C. Section 28 4600 - Fire Detection and Alarm: Fire alarm components in ceiling system.

1.03 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.

D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on suspension system components and acoustical units.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Acoustical Units: Quantity equal to 2 percent of total installed.

1.06 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acoustic Tiles/Panels:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. USG: www.usg.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Suspension Systems:
   1. Same as for acoustical units.

2.02 ACOUSTICAL UNITS

A. Acoustical Units - General: ASTM E1264, Class A.

B. Acoustical Panels, Type ACT: Painted mineral fiber, with the following characteristics:
   1. Classification: ASTM E1264 Type A.
      a. Form: 2, water felted.
      b. Pattern: "C" - perforated, small holes.
   2. Size: 24 by 24 inches.
   3. Thickness: 5/8 inch.
   4. Light Reflectance: 84 percent, determined in accordance with ASTM E1264.
   5. NRC Range: 0.50 to 0.60, determined in accordance with ASTM E1264.
   6. Ceiling Attenuation Class (CAC): 33, determined in accordance with ASTM E1264.
   7. Panel Edge: Square.
   8. Color: White.
   9. Suspension System Type G-1: Exposed grid.
   10. Products:
      a. USG Corporation; Radar Acoustical Panels: www.usg.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 SUSPENSION SYSTEMS

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold-down clips, stabilizer bars, clips, and splices as required.

B. Exposed Suspension System: Hot-dipped galvanized steel grid and cap.
   1. Profile: Tee; 15/16 inch face width.
   2. Finish: Baked enamel.
   3. Products:
      a. USG Corporation; Donn Brand DX/DXL 15/16 inch Acoustical Suspension System: www.usg.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.

B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.

C. Hold-Down Clips: Manufacturer's standard clips to suit application.

D. Perimeter Moldings: Same metal and finish as grid.

E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

A. Install after major above-ceiling work is complete.

B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions, as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.

D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Miter corners.

E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

F. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

G. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

H. Do not eccentrically load system or induce rotation of runners.

I. Do not use exposed fasteners, including pop rivets, on molding and trim.

3.04 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

E. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Cut can light fixtures to be centered in tile.
   4. Double cut and field paint exposed reveal edges.

F. Where round obstructions occur, provide preformed closures to match perimeter molding.

G. Install hold-down clips on panels within 20 ft of an exterior door.

3.05 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.06 CLEANING

A. Clean surfaces.

B. Replace damaged or abraded components.

END OF SECTION

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SECTION 09 6500
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Installation accessories.

1.02 REFERENCE STANDARDS

A. ASTM D6329 - Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers.

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

D. ASTM F1700 - Standard Specification for Solid Vinyl Floor in Modular Format such as Tile(s) or Plank(s).

E. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

F. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

G. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

H. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings.

I. UL 2824 - GREENGUARD Certification Program Method for Measuring Microbial Resistance from Various Sources Using Static Environmental Chambers.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Floor Tile: Furnish 2 percent of each type, color, and pattern of floor tile installed.
   3. Extra Wall Base: Quantity equivalent to 5 percent of each type and color.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

D. Protect roll materials from damage by storing on end.

E. Do not double stack pallets.

1.06 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 TILE FLOORING

A. Vinyl Tile - Type LVT: Solid vinyl with color and pattern throughout thickness.
   1. Manufacturers:
      a. Patcraft; Timber Grove II 5 mm: www.patcraft.com.
      b. Substitutions: See Section 01 6000 - Product Requirements.
   2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
   3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with NFPA 253, ASTM E 648, ASTM E 648, or NFPA 253.
   4. Mold and Microbial Resistance: Highly resistant when tested in accordance with ASTM D6329; certified in accordance with UL 2824.
   5. Plank Tile Size: 6 by 48 inch.
   6. Total Thickness: 0.197 inch.
   7. Color: To be selected by Architect from manufacturer's full range.

2.02 RESILIENT BASE

A. Resilient Base - Type RB: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
   1. Manufacturers:
      a. Roppe Corporation: www.roppe.com/#sle.
      b. Tarkett Flooring: www.tarkett.com/#sle.
      c. Armstrong World Industries, Inc.: www.armstrong.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.
   2. Height: 4 inches.
   3. Thickness: 0.125 inch.
   4. Corners: Job formed.
   5. Length: Roll.
   6. Color: To be selected by Architect from manufacturer's full range.

2.03 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Floor Finish Transitions: Provide resilient floor transition for the following conditions:
   1. Carpet to resilient flooring.
   2. Resilient flooring to concrete.
   3. Other areas not identified, but required.

C. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
   1. Test as Follows:
      a. Alkalinity (pH): ASTM F710.
      b. Internal Relative Humidity: ASTM F2170.
      c. Moisture Vapor Emission: ASTM F1869.
   2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI (RWP).

B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

C. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.

D. Prohibit traffic until filler is fully cured.

E. Clean substrate.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Adhesive-Applied Installation:
   1. Spread only enough adhesive to permit installation of materials before initial set.
   2. Fit joints and butt seams tightly.
   3. Set flooring in place, press with heavy roller to attain full adhesion.

D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
   1. Resilient Strips: Attach to substrate using adhesive.

F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.

C. Install plank tile with a random offset of at least 6 inches from adjacent rows.

3.05 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Install base on solid backing. Bond tightly to wall and floor surfaces.

C. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and wax in accordance with manufacturer's instructions.

3.07 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 6813
TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet tile, fully adhered.

B. Removal of existing carpet tile.

1.02 RELATED REQUIREMENTS

A. Section 09 6500 - Resilient Flooring: Rubber base.

1.03 REFERENCE STANDARDS

A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials.

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

C. CRI 104 - Standard for Installation of Commercial Carpet.

D. CRI (GLP) - Green Label Plus Testing Program - Certified Products.

E. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

C. Shop Drawings: Indicate the following: layout of seams , direction of carpet pile, location of edge moldings, transitions, transitions to other materials, and starting point in each location.

D. Verification Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

E. Operation and Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

1.06 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Tile Carpeting, Type CPT-1: Tufted, manufactured in one color dye lot.
   1. Product: Tuff Stuff II - First Step II manufactured by Mohawk Group.
   2. Tile Size: 24 by 24 inch, nominal.
   3. Color: To be selected by Architect.

4. Pattern: As indicated on drawing.

B. Tile Carpeting, Type CPT-2: Tufted, manufactured in one color dye lot.
1. Product: Learning Lab I0661 manufactured by Patcraft.
2. Tile Size: 24 by 24 inch, nominal.
3. Thickness: 0.236 inch.
4. Color: As selected by Architect.
5. Installation Direction: Quarter turn.
6. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
7. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").

2.02 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Edge Strips: Embossed aluminum, _____ color.

C. Rubber Base: As specified in Section 09 6500.

D. Rubber Transition: As specified in Section 09 6500.

E. Adhesives:
1. Compatible with materials being adhered; maximum VOC content of 50 g/L; CRI (GLP) certified.

F. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.

C. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Remove existing carpet tile.

B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

C. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.

D. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

E. Vacuum clean substrate.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install carpet tile in accordance with manufacturer's instructions and CRI 104 (Commercial).

C. Blend carpet from different cartons to ensure minimal variation in color match.

D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.

F. Locate change of color or pattern between rooms under door centerline.

G. Fully adhere carpet tile to substrate.

H. Trim carpet tile neatly at walls and around interruptions.

I. Complete installation of edge strips, concealing exposed edges.

3.04 CLEANING

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.

B. Clean and vacuum carpet surfaces.

END OF SECTION

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SECTION 09 9000
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Interior painting and coating systems.

C. Exterior painting and coating systems.

D. Scope:
   1. Finish surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   2. Do not paint or finish the following:
      a. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
      b. Items indicated to receive other finishes.
      c. Items indicated to remain unfinished.
      d. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
      e. Stainless steel, anodized aluminum, bronze, terne, and lead items.
      f. Marble, granite, slate, and other natural stones.
      g. Floors, unless specifically so indicated.
      h. Ceramic and other tiles.
      i. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
      j. Exterior insulation and finish system (EIFS).
      k. Glass.
      l. Acoustical materials, unless specifically so indicated.
      m. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 08 1113 - Hollow Metal Doors and Frames: Shop-primed items.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.

B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials.

C. SSPC-SP 1 - Solvent Cleaning.

D. SSPC-SP 2 - Hand Tool Cleaning.

E. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Product characteristics.
   2. Surface preparation instructions and recommendations.
   3. Primer requirements and finish specification.
   4. Storage and handling requirements and recommendations.
   5. Application methods.
   6. Clean-up information.

C. Samples: Submit three paper draw down samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.

1. Where sheen is specified, submit samples in only that sheen.
2. Where sheen is not specified, submit each color in each sheen available.

D. Maintenance Data: Submit coating maintenance manual including finish schedule showing where each product/color/finish was used, safety data sheets (SDS), and care and cleaning instructions.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 6000 - Product Requirements for additional provisions.
2. Extra Paint and Finish Materials: 1 gallon of each color; store where directed.
3. Label each container with color in addition to manufacturer's label.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, product name, product code, color designation, VOC content, batch date, environmental handling, surface preparation, application, and use instructions.

C. Paint Materials: Store at a minimum of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS

A. Do not apply materials when environmental conditions are outside the ranges required by manufacturer.

B. Follow manufacturer's recommended procedures for producing the best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Provide all paint and coating products from the same manufacturer to the greatest extent possible.
1. In the event that a single manufacturer cannot provide all specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.

C. Basis of Design Products: Subject to compliance with requirements, provide Sherwin-Williams Company (The) products indicated; www.sherwin-williams.com

D. Other Acceptable Manufacturers:
1. Behr Process Corporation: www.behr.com
2. Benjamin Moore & Co: www.benjaminmoore.com
3. PPG Paints: www.ppgpaints.com

2.02 PAINTINGS AND COATINGS

A. General:
1. Provide factory-mixed coatings unless otherwise indicated.
2. Do not reduce, thin, or dilute coatings or add materials to coatings unless specifically indicated in manufacturer's instructions.
3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
4. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.

B. Volatile Organic Compound (VOC) Content:
1. Provide paints and finishes that comply with the most stringent requirements specified in the following:

a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.

2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site, or other method acceptable to authorities having jurisdiction.

C. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

D. Primers: As recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

E. Flammability: Comply with applicable code for surface burning characteristics.

F. Colors: To be selected from manufacturer's full range of available colors.
1. Extend colors to surface edges; colors may change at any edge as directed by Architect.

2.03 PAINT SYSTEMS - EXTERIOR

A. Metal: Ferrous Metals (Primed), Galvanized Steel, and Hollow Metal (Doors and Frames).
1. Alkyd Systems, Water Based:
a. Low Sheen Finish:
1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com
2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Water Based Alkyd Urethane Enamel Low Sheen, B53-1250 Series: www.sherwin-williams.com

B. Metal: Ferrous Metals (Unprimed).
1. Alkyd Systems, Water Based:
a. Low Sheen Finish:
1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com
2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Water Based Alkyd Urethane Enamel Low Sheen, B53-1250 Series: www.sherwin-williams.com

2.04 PAINT SYSTEMS - INTERIOR

A. Concrete Ceilings: Precast concrete.
1. Dryfall Waterborne Topcoats:
a. Flat Finish:
1) 1st and 2nd Coat: Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, B42-181 Series: www.sherwin-williams.com

B. Masonry: Concrete masonry units (CMU).
1. Latex Systems:
a. Semi-Gloss Finish:
1) 1st Coat: Sherwin-Williams PrepRite Block Filler, B25W25: www.sherwin-williams.com
2) 2nd and 3rd Coat: Sherwin-Williams ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series: www.sherwin-williams.com
2. Epoxy Systems, Water Based:
a. Location: All restrooms.
b. Eg-Shel/Low Luster Finish:
1) 1st Coat: Sherwin-Williams Loxon Block Surfacer, LX01W200: www.sherwin-williams.com
2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K45 Series: www.sherwin-williams.com

C. Metal: Hollow Metal (Doors and Frames).
1. Epoxy Systems, Water Based: Hollow Metal Doors and Frames
a. Semi-Gloss Finish:

1) 1st and 2nd Coat: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46 Series: www.sherwin-williams.com

D. Metal: Structural steel columns and beams, Structural steel joists, Miscellaneous steel, and Ferrous metal (Unprimed).
   1. Alkyd Systems, Water Based:
      a. Low Sheen Finish:
         1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com
         2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Water Based Alkyd Urethane Enamel Low Sheen, B53-1250 Series: www.sherwin-williams.com
   2. Dryfall Waterborne Topcoat: Beams, Joists, Metal Deck
      a. Flat Finish:
         1) 1st and 2nd Coat: Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, B42-181 Series: www.sherwin-williams.com

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of coatings until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Proceed with coating application only after unacceptable conditions have been corrected.
   1. Commencing coating application constitutes Contractor's acceptance of substrates and conditions.

F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove mildew from impervious surfaces by scrubbing with solution of water and bleach. Rinse with clean water and allow surface to dry.

D. Remove or repair existing coatings that exhibit surface defects.

E. Masonry: Remove efflorescence and chalk.

F. Gypsum Board: Fill minor defects with filler compound; sand smooth and remove dust prior to painting.

G. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.

H. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Remove rust, loose mill scale, and other foreign substances using methods recommended by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.

I. Seal surfaces that might cause bleed through or staining of topcoat.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions.

C. Apply coatings at spread rate required to achieve manufacturer's recommended dry film thickness and in a uniform appearance.

D. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

E. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Reinstall or remove masking from electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 PRIMING

A. Apply primer to all surfaces unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

B. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to top coat manufacturers.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. Clean surfaces immediately of overspray, splatter, and excess material.

C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.06 PROTECTION

A. Protect finished coatings from damage until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

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DIVISION 10



SPECIALTIES

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SECTION 10 2800
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Commercial toilet accessories.

B. Commercial shower and bath accessories.

C. Changing bench.

1.02 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:
   1. Basis of Design: Bobrick Washroom Equipment, Inc.: www.bobrick.com.
   2. Other acceptable manufacturers:
      a. ASI - American Specialties, Inc: www.americanspecialties.com/#sle.
      b. Bradley Corporation: www.bradleycorp.com/#sle.
   3. Substitutions: Section 01 6000 - Product Requirements.

B. Provide products of each category type by single manufacturer.

2.02 MATERIALS

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: Provide (4) four keys for each accessory to Owner; master key lockable accessories.

C. Stainless Steel Sheet: ASTM A666/A666M, Type 304.

D. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

E. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

2.03 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

2.04 COMMERCIAL TOILET ACCESSORIES

A. Toilet Paper Dispenser: Roll-in-reserve dispenser with hinged front secured with tumbler lockset, surface mounted, non-control delivery with theft-resistant spindle, stainless steel, No. 4 finish (satin).
   1. Capacity: Designed for 5 inch diameter tissue rolls.
   2. Product: B-4288 manufactured by Bobrick.

B. Paper Towel Dispenser: Electric, roll paper type.
   1. Cover: Transparent.
   2. Paper Discharge: Touchless automatic.
   3. Capacity: 8 inch diameter roll.
   4. Mounting: Surface mounted.
   5. Power: Battery operated.
   6. Refill Indicator: Illuminated refill indicator.
   7. Products:
      a. Bobrick Washroom Equipment, Inc.; B-72974: www.bobrick.com..
      b. Bradley Corporation; Product 2494: www.bradleycorp.com..
      c. Georgia-Pacific Professional; GP enMotion Automated Touchless Towel Dispenser: www.gppro.com.
      d. Substitutions: Section 01 6000 - Product Requirements.

C. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gauge refill indicator, tumbler lock.
   1. Minimum Capacity: 40 ounces.
   2. Products:
      a. Bobrick Washroom Equipment, Inc.; B-2111: www.bobrick.com..
      b. Substitutions: Section 01 6000 - Product Requirements.

D. Grab Bars: Stainless steel, smooth surface.
   1. Standard Duty Grab Bars:
      a. Push/Pull Point Load: 250 pound-force, minimum.
      b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, concealed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
      c. Finish: Satin.
   2. Grab Bar Set for Wheelchair Accessible Toilet Stalls:
      a. Length: Straight, 18 inches, 36 inches, and 42 inches long.
      b. Configuration: As indicated on drawings.
      c. Products:
         1) B-5806 manufactured by Bobrick.
         2) Substitutions: Section 01 6000 - Product Requirements.

2.05 COMMERCIAL SHOWER AND BATH ACCESSORIES

A. Shower Curtain Rod: Stainless steel tube, 1-1/4 inch outside diameter, 0.04 inch wall thickness, satin-finished, with 3 inch outside diameter, minimum 0.04 inch thick satin-finished stainless steel flanges, for installation with exposed fasteners.
   1. Product: B-6047 manufactured by Bobrick.

B. Shower Curtain:
   1. Material: Opaque vinyl, 0.008 inch thick, matte finish, with antibacterial treatment, flameproof and stain-resistant.
   2. Size: 36 by 72 inches, hemmed edges.
   3. Grommets: Stainless steel; pierced through top hem on 6 inch centers.
   4. Color: White.
   5. Shower Curtain Hooks: Chrome-plated or stainless steel spring wire designed for snap closure.

C. Robe Hook Type: Heavy-duty stainless steel, single-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.
   1. Products:
      a. B-6717 manufactured by Bobrick.
      b. Substitutions: Section 01 6000 - Product Requirements.

2.06 CHANGING BENCH

A. Manufacturers:
   1. C:
      a. Lyon Workspace Products: www.lyonworkspace.com.
      b. Penco Products, Inc: www.pencoproducts.com.
      c. Republic Storage Systems Co: www.republicstorage.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.
   2. Changing Bench: Free standing and wall supported type; bench top of 1.25 inch laminated maple; painted steel pedestals and wall brackets.
      a. Accessibility: Comply with ICC A117.1 and ADA Standards.
      b. Depth:
         1) Accessible: 20 inches minimum deep
      c. Width: As indicated on
      d. Thickness: 1.25 inches.
      e. Edges: All corners to be rounded and sanded.
      f. Finish: Top and edges shall have two coats of a clear finish. Bottom shall have one coat.
   3. Wall Support Bracket: A&M Hardware, Inc: A&M 18"x18"; www.aandmhardware.com.
      a. Black powder coat finish.
      b. Quantity: 2 minimum per bench.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
   1. Grab Bars: As indicated on drawings.
   2. Other Accessories: As indicated on drawings.

3.04 PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

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DIVISION 11



EQUIPMENT

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SECTION 11 3013
RESIDENTIAL APPLIANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Kitchen appliances.

1.02 RELATED REQUIREMENTS

A. Section 22 1005 - Plumbing Piping: Plumbing connections for appliances.

B. Section 26 0583 - Wiring Connections: Electrical connections for appliances.

1.03 REFERENCE STANDARDS

A. UL (DIR) - Online Certifications Directory.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.

C. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five (5) year manufacturer warranty on refrigeration system of refrigerators.

C. Provide ten (10) year manufacturer warranty on magnetron tube of microwave ovens.

D. Provide ten (10) year manufacturer warranty on tub and door liner of dishwashers.

PART 2 PRODUCTS

2.01 KITCHEN APPLIANCES

A. Provide Equipment Eligible for Energy Star Rating: Energy Star Rated.

B. Refrigerator: Free-standing, side-by-side, and frost-free.
   1. Capacity: Total minimum storage of 27 cubic ft; minimum 15 percent freezer capacity.
   2. Energy Usage: Minimum 20 percent more energy efficient than energy efficiency standards set by U.S. Department of Energy (DOE).
   3. Features: Include glass shelves, automatic icemaker, and light in freezer compartment.
   4. Exterior Finish: Stainless steel.
   5. Manufacturers:
      a. GE Appliances; Model: GNE27JYMFS: www.geappliances.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

C. Range: Electric, free-standing, with glass-ceramic cooktop.
   1. Size: 30 inches wide.
   2. Oven: Self-cleaning.
   3. Elements: Five (5).
   4. Controls: Push-to-turn knobs with electronic clock and timer.
   5. Features: Include storage drawer, oven door window, broiler pan and grid, and oven light.
   6. Exterior Finish: Stainless steel.
   7. Manufacturers:

a. GE Appliances; Model: GRF500SVSS: www.geappliances.com/#sle.
b. Substitutions: See Section 01 6000 - Product Requirements.

D. Microwave: Over-the-range.
1. Capacity: 1.9 cubic ft.
2. Power: 1000 watts.
3. Features: Include turntable, cooktop light, night light, undercabinet mounting kit, and 4-speed exhaust fan.
4. Exterior Finish: Stainless Steel.
5. Venting type: External.
6. Manufacturers:
a. GE Appliances; Model: JVM7195SKSS: www.geappliances.com/#sle.
b. Substitutions: See Section 01 6000 - Product Requirements.

E. Dishwasher: Undercounter.
1. Controls: Solid state electronic.
2. Wash Levels: Two (2).
3. Cycles: Five (5), including AutoSense, Heavy Wash, Normal, Wash 1 Hour, and Wash Rinse.
4. Features: Include rinse aid dispenser, optional no-heat dry, optional water temperature boost, adjustable upper rack, and adjustable lower rack.
5. Finish: Stainless steel .
6. Manufacturers:
a. GE Appliances; Model: GDT650SYVFS: www.geappliances.com/#sle.
b. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify utility rough-ins are provided and correctly located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.03 ADJUSTING

A. Adjust equipment to provide efficient operation.

3.04 CLEANING

A. Remove packing materials from equipment and properly discard.

B. Wash and clean equipment.

END OF SECTION

DIVISION 12



FURNISHINGS

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SECTION 12 2400
WINDOW SHADES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior manual roller shades.

1.02 REFERENCE STANDARDS

A. WCMA A100.1 - Standard for Safety of Window Covering Products.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Sequencing:
   1. Do not fabricate shades until field dimensions for each opening have been taken with field conditions in place.
   2. Do not install shades until final surface finishes and painting are complete.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets, including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.

C. Selection Samples: Include fabric samples in full range of available colors and patterns.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of this type with minimum two years of documented experience with shading systems of similar size and type.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.

B. Handle and store shades in accordance with manufacturer's recommendations.

1.07 FIELD CONDITIONS

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Interior Manually Operated Roller Shades:
   1. Draper, Inc; Clutch Operated FlexShade: www.draperinc.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ROLLER SHADES

A. General:
   1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
   2. Provide shade system that operates smoothly when shades are raised or lowered.

B. Interior Roller Shades - Basis of Design: Draper, Inc; Clutch Operated FlexShade: www.draperinc.com/#sle.
   1. Description: Single roller, manually operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and other components necessary for complete installation.
      a. Mounting: Window jamb mounted - inside, between jambs.
      b. Size: As indicated on drawings.
      c. Fabric: As indicated under Shade Fabric article.

2. Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
3. Roller Tubes: As required for type of shade operation; designed for removal without removing mounting hardware.
    a. Material: Extruded aluminum or steel, with wall thickness and material selected by manufacturer.
    b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
4. Hembars: Designed to maintain bottom of shade straight and flat, selected from manufacturer's standard options.
    a. Style: Closed pocket; aluminum elliptical slat inside pocket with heat-sealed ends.
5. Manual Operation:
    a. Clutch Operator: Manufacturer's standard material and design, permanently lubricated.
    b. Drive Chain: Continuous loop, stainless steel, beaded ball chain, 95 lb minimum breaking strength; comply with WCMA A100.1. Provide upper and lower limit stops.
6. Accessories:
    a. Fascia: Extruded aluminum, size as required to conceal shade mounting, attachable to mounting end caps, without exposed fasteners; powder coat finish.
        1) Color: As selected by Architect.
    b. Fasteners: Noncorrosive, and as recommended by shade manufacturer.

2.03 SHADE FABRIC

A. Fabric: Nonflammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
    1. Manufacturers:
        a. Mermet Corporation; SheerWeave 7000 RD: www.mermetusa.com.
        b. Substitutions: See Section 01 6000 - Product Requirements.
    2. Material: Polyester with acrylic backing.
    3. Openness Factor: Opaque.
    4. Color: As selected by Architect from manufacturer’s full range of colors.

2.04 ROLLER SHADE FABRICATION

A. Field measure finished openings prior to ordering or fabrication.

B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
    1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window sill.
    2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb.

C. Dimensional Tolerances: As recommended in writing by manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine finished openings for deficiencies that may preclude satisfactory installation.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.

B. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.

B. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 CLEANING

A. Clean soiled shades and exposed components as recommended by manufacturer.

B. Replace shades that cannot be cleaned to "like new" condition.

3.05 PROTECTION

A. Protect installed products from subsequent construction operations.

END OF SECTION

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DIVISION 26



ELECTRICAL

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SECTION 26 0000
ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. General requirements for Electrical Contractor.
2. Scope of work.
3. Alternates.
4. Permits, licenses, and fees.
5. Inspections.
6. Record drawings.
7. Operation and maintenance manuals.
8. Warranty.
9. Tests.

1.02 GENERAL REQUIREMENTS

A. This section applies to and forms a part of each of the sections as stated in the Scope of Work.

B. General and Supplementary Conditions, and Division 1 shall apply to all work specified in this section.

C. All specifications, corresponding Drawings and all addenda form a complete set of documents for Work for this project, and no part shall be considered complete without the other.

D. All sales, use, and any other taxes shall be paid by Contractor.

E. By submitting a bid, Contractor agrees that he/she is skilled and experienced in use of and in interpretation of drawings and specifications. Contractor further agrees that he/she has carefully reviewed all drawings, all specifications and all addenda, which constitute bid documents for this contract, and finds them free of ambiguities and good and sufficient for bidding and construction purposes.

F. Where items on the Electrical drawings, such as concrete pads or where indicated to be “By Others,” or “By Respective Contractor,” the Electrical Contractor shall notify the General Contractor or applicable trade of those items prior to submitting a bid or provide the cost of the work in his/her bid and sub-contract the work to the applicable contractor. The Electrical Contractor shall bear the cost and be responsible for any items noted on the electrical drawings to be by other trades if notification of work was not provided to the applicable trade.

1.03 DEFINITIONS

A. Contractor: Where the word CONTRACTOR is used in Division 26, 27, or 28 specifications and the electrical drawings it shall mean the Electrical Contractor. Where a reference to a contractor other than the Electrical Contractor is required, the contractor will be identified as such.

B. Provide: Where the word PROVIDE is used in Division 26, 27, or 28 specifications and the drawings it shall mean the Electrical Contractor shall furnish all labor and material and install completely and properly and ensure equipment operates properly and is ready for use. Where only labor or only material is required the item will be noted as such.

1.04 SCOPE OF WORK

A. The work under this section of the specifications consists of providing all labor, supervision, equipment, and materials necessary for and incidental to the installation of the complete electrical systems required by these specifications and/or drawings of the contract.

1. All Division 26 specifications.
2. All Division 27 specifications.
3. Section 28 4621 – Addressable Fire Alarm Systems.

1.05 PERMITS, LICENSES, AND FEES

A. Obtain and pay for all licenses and permits, and pay all fees and charges for the connection to outside services as required by inspecting authorities having jurisdiction.

B. Coordinate service from electric utility and include any fees required for service in bid.

C. Disposal fees: Fees for disposal of demolished material shall be included in the Contractor's bid.

1.06 CODES AND ORDINANCES

A. The entire installation of the electrical systems shall be made in accordance with all ordinances, laws, regulations, and codes applicable to the work involved. If, in any instance, the plans and specifications conflict with such laws, the law shall take preference. This does not relieve the contractor from complying with any requirements of the drawings and specifications that may be in excess of the rules and not contrary to same.

B. All work shall conform to applicable sections of the following codes, ordinances, regulations, and/or standards:

1. National Electrical Code (NEC).
2. National Fire Protection Association (NFPA).
3. International Fire Code (IFC).
4. International Building Code (IBC).
5. Life Safety Code NFPA 101.
6. International Energy Conservation Code (IECC).
7. Americans with Disability Act and Architectural Barriers Act Accessibility Guidelines.
8. OSHA.
9. All applicable federal, state, and local laws, regulations, and code amendments.

1.07 INSPECTIONS

A. Before submitting a proposal on the work contemplated in these specifications and accompanying drawings, each bidder shall examine the site and familiarize himself with the existing conditions and limitations. No extras will be allowed because of the contractor's misunderstanding as to the amount of work involved or his lack of knowledge of existing site conditions.

B. Contractor shall coordinate inspections with appropriate agency or Authority Having Jurisdiction and comply with all required inspections. No work shall be concealed until after inspection and approval by proper authorities. If Contractor does not allow for inspections and proper approval, the Contractor shall be responsible for revealing work and restoring concealed area as required.

1.08 TEMPORARY UTILITIES

A. Refer to Division 1 for additional provisions for temporary power and telephone/data.

B. Temporary power provisions shall comply with NEC requirements.

1.09 DRAWINGS

A. The drawings indicate the extent and general layout of the electrical systems and are intended to be as accurate as planning can determine at the scale shown for estimating purposes only. Field verification of dimensions, locations, and construction details is required. Review appropriate drawings, make field measurements and adjust work to suit the conditions encountered. Electrical drawings are only diagrammatic but shall be followed as closely as actual construction of other trades will permit.

B. In general, the electrical drawings are drawn to scale as noted; however, this Contractor shall be responsible for referencing Architectural drawings for exact dimensions and locations of partitions, walls, ceiling heights, etc. wherever possible and not scaling the electrical drawings.

C. This Contractor shall coordinate light fixture locations with Architectural Reflected Ceiling Plans and mechanical work.

D. Notify the Architect/Engineer of any discrepancies in or omissions from the drawings and documents. Interpretations will be made only by written Addenda. If discrepancies are not reported, the contractor shall bid the greater quantity or better quality, and appropriate adjustment will be made after contract award.

E. Discrepancies discovered during construction shall immediately be called to the attention of the Architect/Engineer for clarification.

1.10 RECORD DRAWINGS

A. The Contractor shall maintain one set of drawings at the job site to be used as a master copy. All changes and deviations shall be clearly marked and noted by colored pencil. These drawings shall be submitted to the Architect upon project completion.

1. Panelboard circuit directories shall reflect all field changes and match circuit directories installed in panelboards.
2. Record locations and invert elevations of underground installations.

B. Refer to Division 1 for additional requirements.

1.11 COORDINATION

A. Sequence and coordinate work with other trades to avoid conflict of space and time sequence. If interference develops, the matter shall be brought to the attention of the Architect/Engineer for decision.

B. Coordinate installation of large equipment requiring positioning before building is enclosed.

C. Coordinate electrical characteristics and connection requirements of equipment furnished by other trades and wired under Division 26 prior to rough-in.

1.12 OPERATION AND MAINTENANCE MANUALS

A. Submit Operation and Maintenance Manual to the Architect/Engineer for approval before the final inspection and prior to scheduling systems demonstration for the Owner.

B. Manual shall contain all required information. Required information shall include, but not be limited to:

1. Master index of each section in the front of the manual.
2. Informational section listing the name, address, and phone number of the Electrical Contractor.
3. Informational section listing all vendors and contact information of each vendor including address and phone number.
4. Maintenance schedule for items requiring periodic maintenance.
5. Provide a section for each type of equipment. Information contained shall include shop drawing literature, capacities and size of equipment, operating instructions, and maintenance instructions.
6. Certificate of warranty and service.

C. Refer to Division 1 for additional requirements.

1.13 JOBSITE SAFETY

A. The Architect/Engineer is not responsible for the safety of the Contractor or their employees. The Architect/Engineer is not responsible for review of the adequacy of the Contractor’s safety measures in, on, or near the construction site.

B. The Contractor shall be solely and completely responsible for the safety of their employees, personnel, and equipment continuously, not just during normal working hours. It is the

responsibility of the Contractor to implement adequate safety measures and to enforce those measures.

C. Refer to Division 1 for additional requirements.

1.14 WARRANTY

A. This Contractor shall guarantee all equipment, material, and workmanship for a period of one year from date of final certificate. Any defects in electrical equipment, workmanship, or material that may appear to cause trouble of any kind shall be remedied at no cost to the Owner during guarantee period.

B. Comply with specified warranty for specific equipment as required in other sections of these specifications (i.e. generator).

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide all materials and equipment necessary to comply with this section.

PART 3 - EXECUTION

3.01 PROGRESS OF WORK

A. This Contractor shall coordinate work schedules with General Contractor and other trades. Complete entire installation as soon as condition of building will permit.

B. This Contractor shall assume any cost resulting from defective or ill-timed work performed under this Division.

3.02 DISPOSAL OF DEMOLISHED MATERIALS

A. Dispose of all equipment in accordance with all Federal, State, Local Laws, and Environmental Protection Agency (EPA).

B. All demolished material and equipment shall be removed from the site, unless otherwise indicated to be reused. Demolished materials shall be transported and disposed of in a legal fashion.

C. Contractor shall not salvage any material that is to be disposed of for his own benefit without written approval of Owner.

3.03 WORKMANSHIP

A. All work shall be of professional quality and in accordance with industry standards. Poor quality installation will be cause for rejection of work. The Contractor shall assume all costs to redo poor quality workmanship and installations.

3.04 TESTS

A. Test all equipment installed under these specifications and demonstrate its proper operation to the Architect/Engineer and Owner’s representative.

B. Do not test or operate equipment for any purpose until it has been fully installed and serviced in accordance with the manufacturer’s instructions.

C. The entire installation shall be tested free from open and short circuits and improper grounds.

D. All deficiencies shall be corrected by the Contractor and system shall be re-tested. This process shall be repeated until free of deficiencies.

E. At the time of final observation, be prepared to test and operate any system as required by Architect, Engineer, or Owner’s representative.

F. Provide written verification of test results of various systems as required by inspecting authorities and by other sections of these specifications.

3.05 COMMISSIONING AND TRAINING

A. Provide commissioning and training for operating equipment and systems as required by these specifications.

END OF SECTION

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SECTION 26 0500
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Shop drawing requirements.
2. Electrical materials requirements.

1.02 SHOP DRAWINGS

A. Electrical equipment shop drawings shall be submitted in an electronic format, PDF. Shop drawings will be reviewed and submitted back to the Contractor in an electronic format. The Contractor shall produce hard copies as required for his work and as required for Owner's Operation and Maintenance manuals. Shop drawings shall be reviewed by the Contractor with required changes indicated and shall be marked to indicate Contractor's approval prior to Architect/Engineer review.

B. Shop drawing data shall include, but not be limited to, the following:

1. Manufacturer, catalog number, and trade name, if any.
2. Electrical characteristics and performance data.
3. Dimensions.
4. Descriptive material.
5. Specific items as required by other sections of these specifications.

1.03 MATERIALS REQUIRING SHOP DRAWINGS

A. Provide shop drawings for the following materials:

1. 26 0533: Raceways and Boxes.
2. 26 0943: Lighting Controls.
3. 26 2416: Panelboards.
4. 26 2726: Wiring Devices, time clocks and photocells.
5. 26 2813: Fuses.
6. 26 2816: Enclosed Switches.
7. 26 5000: Light Fixtures.
8. 27 1100: Telecommunications.
9. 27 5116: Paging System.
10. 28 4621: Addressable Fire Alarm Systems.

1.04 MATERIALS SELECTION PROCEDURES

A. Quality: Where specifications and drawings specify material or equipment under a brand name and/or catalog number, the intention is not to exclude other types of material or equipment but to indicate the type and level of quality of the product. Other manufacturers may obtain prior approval for their product by submitting product data to the Architect/Engineer.

B. Prior Approval: Equipment and material shall be as specified, unless prior approvals are submitted seven (7) days prior to the bid date and such submittals are submitted to the Architect/Engineer in writing. Prior approval submittal shall include, but not be limited to, product specification sheets indicating manufacturer, catalog number, electrical characteristics and performance data, and dimensions.

C. After the bid has been released, this Contractor shall submit complete shop drawings for required materials to the Architect for approval as soon as possible so that delivery of materials will not hinder the schedule of the project. None of the items listed shall be purchased, delivered to the

site, or installed until the item is approved. No substitution will be permitted after approval except where such substitution is considered by the Architect to be in the best interests of the Owner.

D. Should the Contractor fail to comply with any of the above requirements, the Architect/Engineer reserves the right to select any and all items as specified herein, which selection shall be final and binding upon the Contractor. The materials selected or approved, as the case may be, by the Architect/Engineer, shall be used at no additional cost to the Owner.

E. Where a Contractor chooses to use an approved material or item of equipment, other than the one shown on the drawings, or specified in detail, he shall be responsible for coordinating the necessary changes in other work and shall bear the cost of such changes.

1.05 QUALITY ASSURANCE

A. All material shall be new, free of defects, of the quality specified, and shall conform to current applicable industry standards. Minimum requirements include, but are not limited to, the following standards:

1. UL - Underwriters' Laboratories, Inc.
2. NEMA - National Electrical Manufacturer's Association.
3. ANSI – American National Standards Institute.
4. NETA – International Electrical Testing Association.
5. ICEA – Insulated Cable Engineer's Association.
6. IEEE – Institute of Electrical and Electronic Engineers.

B. All work shall be neat, follow industry standards, and complete in both effectiveness and appearance. All work shall be executed by persons licensed and skilled in the trade.

1.06 MATERIAL HANDLING, STORAGE, AND PROTECTION

A. This Contractor shall make provisions for delivery and safe storage of materials and arrangements for introduction of equipment too large to pass through finished or existing openings into building.

B. During construction, it shall be the responsibility of this Contractor to protect the surface of equipment and material furnished.

C. Equipment and material shall be stored in the same type of environment it is rated for. Do not store NEMA 1, or indoor only equipment outdoors where exposed to weather. Refer to NEC 110.11.

PART 2 - PRODUCTS

2.01 STANDARDIZATION OF PRODUCT MANUFACTURER

A. Except as noted, all switchboards, panelboards, safety switches, and equipment or wiring cabinets provided under this bid package shall be manufactured by the same company, all finishes shall be the same color, and all equipment shall fit the space designated.

B. Except as noted, all magnetic starters, manual starters, and motor control centers shall be manufactured by the same company, all finishes shall be the same color, and all equipment shall fit the space designated.

C. Wiring devices, lighting fixtures, and other items covered under a single specification section shall be of the same manufacturer and style whenever practical or where failure to do so is visibly noticeable.

2.02 CONCRETE

A. Unless specified otherwise on the drawings, concrete shall be 3000-psi, 28-day compressive strength and shall conform with Division 3 requirements.

2.03 PLYWOOD BACKBOARD

A. Electrical Contractor shall provide plywood backboard for mounting of equipment as indicated on drawings.

B. In general, backboard shall be installed from 24-inches above finished floor to 6'-0" above floor using standard 4-ft x 8-ft size plywood. Plywood shall cover the width of wall as shown on the drawings but not less than required to accommodate equipment to be mounted on backboard.

C. Plywood shall be ¾-inch thick, painted with two coats of fire retardant gray paint.

2.04 ACCESS PANELS

A. Provide access panels for electrical equipment which are required to be accessible by code.

B. This Contractor shall relocate electrical apparatus, raceways, or devices if they are blocking access panels of other trades.

PART 3 - EXECUTION

3.01 ELECTRICAL EQUIPMENT INSTALLATION

A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.

B. In general, all wiring and electrical items shall be concealed, with visual portions set true and plumb with building lines. Items shall be aligned in an orderly fashion consistent with the patterns and design of the background material.

C. Where items are to be surface mounted, such items shall be grouped together. Provide a ¾" plywood backing, painted two coats gray paint.

D. Where electrical conduits cross piping systems of other trades, give the right of way to raceways and piping systems installed at a required slope.

3.02 PENETRATIONS

A. All work shall be of professional quality and in accordance with industry standards. Poor quality installation will be cause for rejection of work. The Contractor shall assume all costs to redo poor quality workmanship and installations.

3.03 TESTS

A. Test all equipment installed under these specifications and demonstrate its proper operation to the Architect/Engineer and Owner's representative.

B. Do not test or operate equipment for any purpose until it has been fully installed and serviced in accordance with the manufacturer's instructions.

C. The entire installation shall be tested free from open and short circuits and improper grounds.

D. All deficiencies shall be corrected by the Contractor and system shall be re-tested. This process shall be repeated until free of deficiencies.

E. At the time of final observation, be prepared to test and operate any system as required by Architect, Engineer, or Owner's representative.

F. Provide written verification of test results of various systems as required by inspecting authorities and by other sections of these specifications.

3.04 COMMISSIONING AND TRAINING

A. Provide commissioning and training for operating equipment and systems as required by these specifications.

END OF SECTION

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SECTION 26 0519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.
2. Connectors, splices, and terminations rated 600 V and less.

B. Unless otherwise specified in other sections of these specifications, control, communication, and signal wiring shall be provided, installed, and connected to perform the function specified in other sections of this specification.

C. Quantities of conductors are shown for bidding purposes only. The Contractor shall field verify exact quantities and make adjustments as required for proper connection and operation.

1.02 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.01 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

D. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.

2.02 METAL-CLAD CABLE, TYPE MC

A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 1569.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Circuits:

1. Single circuit and multi-circuit with color-coded conductors].
2. Power-Limited Fire-Alarm Circuits: Comply with UL 1424.

D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

E. Ground Conductor: Insulated.

F. Conductor Insulation:

1. Type TFN/THHN/THWN-2: Comply with UL 83.

G. Armor: Steel interlocked.

H. Jacket: PVC applied over armor.

2.03 FIRE-ALARM WIRE AND CABLE

A. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.

B. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG, unless otherwise recommended by system manufacturer.

1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire-alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a two-hour rating.

C. Non-Power-Limited Circuits: Solid-copper conductors with 600 V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.

1. Low-Voltage Circuits: No. 16 AWG, minimum, in pathway.
2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.
3. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket with red identifier stripe, NTRL listed for fire-alarm and cable tray installation, plenum rated.

2.04 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Aluminum.
2. Type: One hole with standard barrels.
3. Termination: Compression.

PART 3 - EXECUTION

3.01 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders:

1. Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
2. Copper for feeders. Conductors must be solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
3. Aluminum for panel feeders as indicated on the drawings.

B. Branch Circuits:

1. Copper, Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.02 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN/THWN-2 or XHHW-2, single conductors in raceway.

B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

E. Exposed Branch Circuits, Including in Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.

G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

3.03 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. 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 according to Section 260529 "Hangers and Supports for Electrical Systems."

3.04 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inch (300 mm) of slack.

3.05 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.06 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 05 44 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

END OF SECTION

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SECTION 26 0526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes grounding and bonding systems and equipment.

1.02 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.03 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: In addition to items specified in Section 26 00 00 "Electrical General Requirements," include the following:

1. Submit test reports indicating overall resistance to ground and resistance of each electrode.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.02 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Stranded Conductors: ASTM B8.
2. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
3. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
4. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inch (6.3 by 100 mm) in cross section, with 9/32-inch (7.14 mm) holes spaced 1-1/8 inch (28 mm) apart. Stand-off insulators for mounting must comply with UL 891 for use in switchboards, 600 V and must be Lexan or PVC, impulse tested at 5000 V.

1. Length to be 16-inches (406 mm) unless otherwise noted.

2.03 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

C. Mechanical-Type Bus-Bar Connectors: Cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

D. Compression-Type Bus-Bar Connectors: Copper or copper alloy, with two wire terminals.

E. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.

F. Cable-to-Cable Connectors: Compression type, copper or copper alloy.

G. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.

H. Conduit Hubs: Mechanical type, terminal with threaded hub.

I. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.

J. Lay-in Lug Connector: Mechanical type, aluminum terminal with set screw.

K. Straps: Solid copper, cast-bronze clamp. Rated for 600 A.

L. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.

M. Water Pipe Clamps:

1. Mechanical type, two pieces with zinc-plated bolts.

a. Material: Tin-plated aluminum.
b. Listed for direct burial.

2. U-bolt type with malleable-iron clamp and copper ground connector.

2.04 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 ft. (19 mm by 3 m).

PART 3 - EXECUTION

3.01 APPLICATIONS

A. Conductors: Install solid conductor for No. 10AWG and smaller, and stranded conductors for No. 8 AWG and larger unless otherwise indicated.

B. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Connections to Structural Steel: Welded connectors.

3.02 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

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.
7. Metal clad cable runs.

3.03 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inch (50 mm) below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

D. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install 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; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

3.04 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before any conductors are connected.
    a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method according to IEEE 81.

B. Grounding system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Resistance to ground shall be 25 ohms or less. Where tests show resistance to ground is more than 25 ohms, take appropriate action to reduce resistance until it is tested to be 25 ohms or less. Re-test as required to demonstrate compliance.

E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION

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SECTION 26 0529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Steel slotted support systems.
2. Conduit and cable support devices.
3. Support for conductors in vertical conduit.
4. Structural steel for fabricated supports and restraints.
5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
6. Fabricated metal equipment support assemblies.

PART 2 - PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-(10-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c. in at least one surface.

1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
2. Material for Channel, Fittings, and Accessories: Galvanized steel.
3. Channel Width: As required for load but not less than 1-5/8 inches (41.25 mm).
4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

B. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.

D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
5. Toggle Bolts: All-steel springhead type.
6. Hanger Rods: Threaded steel.

2.02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.01 APPLICATION

A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:

1. NECA 1.
2. NECA 101
3. NECA 102.
4. NECA 105.
5. NECA 111.

B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.

C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.02 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC and RMC may be supported by openings through structure members, according to NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Steel: Beam clamps (MSS SP-58,Type 19, 21, 23, 25, or 27), complying with MSS SP-69 or spring-tension clamps.
5. To Light Steel: Sheet metal screws.
6. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.03 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

END OF SECTION

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SECTION 26 0533
RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Raceway requirements for electrical systems.
2. Metal Wireways.
3. Surface Raceways.
4. Boxes, enclosures, and cabinets.

B. Furnish, install, and connect conduit and fittings as required to form coordinated raceway systems to contain conductors and provide for future electrical wiring.

C. Drawings are diagrammatic and do not show all bends, boxes, fittings, or couplings required for complete raceway systems. Provide all components necessary to comply with the NEC.

1.02 ACTION SUBMITTALS

A. Product Data: For the following:

1. Wireways and auxiliary gutters.
2. Surface raceways.
3. Cabinets and cutout boxes.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR RACEWAYS, FITTINGS, AND COMPONENTS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

B. Minimum Trade Size: Metric designator 16 (trade size 1/2), homeruns shall be Metric designator 21 (trade size 3/4).

C. Colors: As indicated on Drawings where raceways are required to be a specific color.

2.02 RACEWAYS

A. Electric Metallic Tubing (EMT-S):

1. General Characteristics:

a. ANSI C80.3.
b. UL 797 and UL Category Control Number FJMX.

2. Material: Steel.
3. Exterior Coating: Zinc.
4. Interior Coating: Zinc with organic top coating.

B. Rigid Metal Conduit (ERMC-S-G):

1. General Characteristics: UL 6 and UL Category Control Number DYWV.
2. Exterior Coating: Zinc.
3. Interior Coating: Zinc with organic top coating.

C. PVC-Coated-Steel Electrical Rigid Metal Conduit (ERMC-S-PVC), Elbows, Couplings, and Nipples:

1. Exterior Coating: PVC complying with NEMA RN and marked ETL Verified PVC-001.

2. Interior Coating: Zinc with organic top coating.
3. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

D. Type FMC-S:

1. General Characteristics: UL 1 and UL Category Control Number DXUZ.
2. Steel Flexible Metal Conduit (FMC-S):

a. Material: Steel.

E. Type LFMC:

1. General Characteristics: UL 360 and UL Category Control Number DXHR.
2. Steel Liquidtight Flexible Metal Conduit (LFMC-S):

a. Material: Steel.

2.03 TYPE PVC RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 651 and UL Category Control Number DZYR.

B. Schedule 40 Rigid PVC Conduit (PVC-40) and Fittings:

1. Dimensional Specifications: Schedule 40.
2. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
b. Markings: For use with maximum 90 deg C wire.

C. Schedule 80 Rigid PVC Conduit (PVC-80) and Fittings:

1. Dimensional Specifications: Schedule 80.
2. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
b. Markings: For use with maximum 90 deg C wire.

2.04 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

B. Fittings for Type ERMC, and Type PVC Raceways:

1. General Characteristics: UL 514B and UL Category Control Number DWTT.
2. Options:

a. Material: Steel.
b. Coupling Method: Compression coupling.

C. Fittings for Type EMT Raceways:

1. General Characteristics: UL 514B and UL Category Control Number FKAV.
2. Options:

a. Material: Steel.
b. Coupling Method:

1) Indoor Wet or Dry or Outdoor Locations: Raintight compression coupling with distinctive color gland nut.

D. Fittings for Type FMC Raceways:

1. General Characteristics: UL 514B and UL Category Control Number ILNR.

E. Fittings for Type LFMC Raceways:

1. General Characteristics: UL 514B and UL Category Control Number DXAS.

2.05 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR THREADED CONDUIT

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 2419 and UL Category Control Number FOIZ.

2.06 SOLVENT CEMENTS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: As recommended by conduit manufacturer in accordance with UL 514B and UL Category Control Number DWTT.

2.07 SURFACE RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 5 and UL Category Control Number RJBT.

B. Steel shall be galvanized with polyester topcoat, ivory finish,

C. One-or two-piece design with base and cover.

D. Fittings: Provide all required fittings and connectors for a complete installation.

E. Manufacturer: Wiremold 500/700/2400 Series or approved equivalent.

F. Surface Boxes: Provide surface boxes, 1-gang or 2-gang as required for installation, that are compatible with surface raceway.

2.08 SURFACE METAL RACEWAYS AND FITTINGS

A. General: Aluminum surface metal raceway system specified herein for branch circuit wiring and/or data network, voice, video, and other low-voltage wiring.

1. Basis of Design: Wiremold ALA4800 System (2-channel raceway), or ALA3800 (1-channel raceway).
2. Equivalent products by Engineer approval.

B. The raceway and all system components must be UL Listed in full compliance with their standard for surface metal raceways and fittings (UL-5). All extrusions are to be 6063-T5 aluminum alloy, with nominal wall thickness of 0.078" [1.99mm] throughout. The surface finish is to be satin, anodized #204 Type clear, Class R1 Mil-Spec with minimum anodized finish of 0.004" [.10mm].

C. The raceway shall be a two-piece design with a base and snap-on cover. The base shall be furnished in 10' [3m] lengths and the cover sections shall be furnished in 5' [1.5m] lengths. The overall dimensions of assembled raceway shall be 6" [152.4mm] wide by 2.25" [57.15mm] deep with a cross sectional area of 8.5 square inches [548.25sq.mm].

D. Base shall have an extruded divider separating the 6” raceway into two equal compartments. The cover shall fit onto both compartments to allow access to only one compartment at a time. The two compartment and separate covers must be available to handle both power and communications wiring.

E. Length: 10’-0” sections.

F. Finish: Satin anodized aluminum.

G. Fittings: Provide all fittings necessary for a complete installation.

H. Provide device covers for devices as shown on the drawings.

2.09 WIREWAYS AND AUXILIARY GUTTERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 870 and UL Category Control Number ZOYX.

B. Metal Wireways and Auxiliary Gutters:

1. Additional Characteristics:

a. 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.
b. Finish: Manufacturer's standard enamel finish.

2. Options:

a. Degree of Protection: Type 1 unless otherwise indicated.
b. Wireway Covers: Hinged type unless otherwise indicated.

2.10 METALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 514A and UL Category Control Number QCIT.

B. Metallic Outlet Boxes:

1. Description: Box having pryout openings, knockouts, threaded entries, or hubs in either the sides of the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.
2. Options:

a. Material: Sheet steel.
b. Cast metal: Aluminum with threaded conduit entry and knockouts, gasketed cover, comply with NEMA requirements
c. Sheet Metal Depth: Minimum 2 inch (50 mm).
d. Cast-Metal Depth: Minimum 1.8 inch (44.5 mm).
e. Luminaire Outlet Boxes and Covers: Nonadjustable, listed and labeled for attachment of luminaire weighing up to 50 lb (23 kg).
f. Paddle Fan Outlet Boxes and Covers: Nonadjustable, designed for attachment of paddle fan weighing up to 70 lb (32 kg).

C. Metallic Conduit Bodies:

1. Description: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.

D. Metallic Device Boxes:

1. Description: Box with provisions for mounting wiring device directly to box.
2. Options:

a. Material: Sheet steel.
b. Sheet Metal Depth: minimum 2 inch (50 mm).
c. Cast-Metal Depth: minimum 1.8 inch (44.5 mm).

2.11 NONMETALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 514C and UL Category Control Number QCMZ.

B. Nonmetallic Conduit Bodies:

1. Description: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.

2.12 CABINETS, CUTOUT BOXES, JUNCTION BOXES, AND PULL BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:

a. Non-Environmental Characteristics: UL 50.
b. Environmental Characteristics: UL 50E.

B. Sheet Metal Cabinets:

1. Description: Enclosure provided with frame, mat, or trim in which swinging door or doors are or can be hung.
2. Additional Characteristics: UL Category Control Number CYIV.

a. Options:
b. Degree of Protection: Type 3R.

C. Sheet Metal Cutout Boxes:

1. Description: Enclosure that has swinging doors or covers secured directly to and telescoping with walls of enclosure.
2. Additional Characteristics: UL Category Control Number CYIV.

a. Options:
b. Degree of Protection: Type 3R.

D. Sheet Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Additional Characteristics: UL Category Control Number BGUZ.

a. Options:
b. Degree of Protection: Type 3R.

E. Cast-Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Additional Characteristics: UL Category Control Number BGUZ.
3. Options:

a. Degree of Protection: Type 3R.

2.13 COVER PLATES FOR DEVICES BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:

a. Reference Standards: UL 514D and UL Category Control Numbers QCIT and QCMZ.
b. Wallplate-Securing Screws: Metal with head color to match wallplate finish.

B. Metallic Cover Plates for Device Boxes:

1. Options:

a. Damp and Wet Locations: Listed, labeled, and marked for location and use. Provide gaskets and accessories necessary for compliance with listing.
b. Wallplate Material: Galvanized Steel.

2.14 HOODS FOR OUTLET BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:

a. Reference Standards:

1) UL 514D and UL Category Control Numbers QCIT and QCMZ.
2) Receptacle, hood, cover plate, gaskets, and seals comply with UL 498 Supplement SA when mated with box or enclosure complying with UL 514A, UL 514C, or UL 50E.

3. Mounts to box using fasteners different from wiring device.

B. Extra-Duty, While-in-Use Hoods for Outlet Boxes:

1. Additional Characteristics: Marked "Extra-Duty" in accordance with UL 514D.
2. Options:

a. Provides gray, weatherproof, "while-in-use" cover.
b. Manufacturer may combine nonmetallic device box with hood as extra-duty rated assembly.

PART 3 - EXECUTION

3.01 SELECTION OF RACEWAYS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of raceways. Consult Architect for resolution of conflicting requirements.

B. Outdoors:

1. Exposed and Subject to Severe Physical Damage: ERMC.
2. Exposed and Subject to Physical Damage: ERMC.

a. Locations less than 2.5 m (8 ft) above finished floor.

3. Exposed and Not Subject to Physical Damage: ERMC.
4. Concealed Aboveground: ERMC, EMT, or PVC-80.
5. Direct Buried: PVC-40.
6. Concrete Encased Not in Trench: PVC-80.
7. Concrete Encased in Trench: PVC-40.

8. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

C. Indoors:

1. Exposed and Subject to Severe Physical Damage: ERMC. Subject to severe physical damage includes the following locations:

   a. Loading docks.
   b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
   c. Mechanical rooms.
   d. Coolers.

2. Exposed and Subject to Physical Damage: ERMC, or EMT. Subject to physical damage includes the following locations:

   a. Locations less than 2.5 m (8 ft) above finished floor.
   b. Stub-ups to above suspended ceilings.

3. Exposed and Not Subject to Physical Damage: EMT.
4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Damp or Wet Locations: ERMC, or Corrosion-resistant EMT.
6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC or FMC.

D. Raceway Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC: Provide threaded type fittings unless otherwise indicated.

3.02 SELECTION OF BOXES AND ENCLOSURES

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Architect for resolution of conflicting requirements.

B. Degree of Protection:

1. Indoors/Outdoors:

   a. Type 3R unless otherwise indicated.
   b. Locations Exposed to Hosedown: Type 4.
   c. Locations Subject to Potential Flooding: Type 6P.
   d. Locations Aboveground Where Mechanism Must Operate When Ice Covered: Type 3S.
   e. Locations in-Ground or Exposed to Corrosive Agents: Type 4X.
   f. Locations in-Ground or Exposed to Corrosive Agents Where Mechanism Must Operate When Ice Covered: Type 3SX.
   g. Damp or Dusty Locations: Type 12.
   h. Locations Exposed to Airborne Dust, Lint, Fibers, or Flyings: Type 4.
   i. Locations Exposed to Hosedown: Type 4.
   j. Locations Exposed to Corrosive Agents: Type 4X.

3.03 INSTALLATION OF RACEWAYS

A. Installation Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for installation of raceways. Consult Architect for resolution of conflicting requirements.
2. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
3. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.
4. Comply with NECA NEIS 101 for installation of steel raceways.

5. Comply with NECA NEIS 102 for installation of aluminum raceways.
6. Comply with NECA NEIS 111 for installation of nonmetallic raceways.
7. Install raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.
8. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to metric designator 35 (trade size 1-1/4) and insulated throat metal bushings on metric designator 41 (trade size 1-1/2) and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
9. Raceway Terminations at Locations Subject to Moisture or Vibration:

    a. Provide insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

B. General Requirements for Installation of Raceways:

1. Complete raceway installation before starting conductor installation.
2. Provide stub-ups through floors with coupling threaded inside for plugs, set flush with finished floor. Plug coupling until conduit is extended above floor to final destination or a minimum of 2 ft (0.6 m) above finished floor.
3. Install no more than equivalent of four 90-degree bends in conduit run, except for telecommunications conduits, for which no more than equivalent of two 90-degree fewer bends are permitted. Support within 12 inch (300 mm) of changes in direction.
4. Make bends in raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
5. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
6. Support conduit within 12 inch (300 mm) of enclosures to which attached.
7. Install raceway sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed raceways, install fitting in flush steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings in accordance with NFPA 70.
8. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal interior of raceways at the following points:

    a. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
    b. Where an underground service raceway enters a building or structure.
    c. Conduit extending from interior to exterior of building.
    d. Conduit extending into pressurized duct and equipment.
    e. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
    f. Where otherwise required by NFPA 70.

9. Do not install raceways or electrical items on "explosion-relief" walls or rotating equipment.
10. Do not install conduits within 2 inch (50 mm) of the bottom side of a metal deck roof.
11. Keep raceways at least 6 inch (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
12. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
13. Install pull wires in empty raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb (90 kg) tensile strength. Leave at least 12 inch (300 mm) of slack at both ends of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

C. Requirements for Installation of Specific Raceway Types:

1. Do not install aluminum raceways or fittings in contact with concrete or earth.
2. Types ERMC and IMC:

   a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

3. Type ERMC-S-PVC:

   a. Follow manufacturer's installation instructions for clamping, cutting, threading, bending, and assembly.
   b. Provide PVC-coated sealing locknut for exposed male threads transitioning into female NPT threads that do not have sealing sleeves, including transitions from PVC couplings/female adapters to Type ERMC-S-PVC elbows in direct-burial applications. PVC-coated sealing locknuts must not be used in place of conduit hub. PVC-coated sealing locknut must cover exposed threads on Type ERMC-S-PVC raceway.
   c. Coat field-cut threads on PVC-coated raceway with manufacturer-approved corrosion-preventing conductive compound prior to assembly.

4. Types FMC and LFMC:

   a. Provide a maximum of 36-inch (915 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

5. Type PVC:

   a. Do not install Type PVC conduit where ambient temperature exceeds 122 deg F (50 deg C). Conductor ratings must be limited to 75 deg C except where installed in a trench outside buildings with concrete encasement, where 90 deg C conductors are permitted.
   b. Comply with manufacturer's written instructions for solvent welding and fittings.

D. Raceways Embedded in Slabs:

1. Run raceways larger than metric designator 27 (trade size 1) below concrete slab.
2. Arrange raceways to cross building expansion joints with expansion fittings at right angles to the joint.
3. Arrange raceways to ensure that each is surrounded by a minimum of 1 inch (25 mm) of concrete without voids.
4. Do not embed threadless fittings in concrete unless locations have been specifically approved by Architect.

E. Stub-ups to Above Recessed Ceilings:

1. Provide EMT, or ERMC for raceways.
2. Provide a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

F. Raceway Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC-S-PVC: Provide only fittings listed for use with this type of conduit. Patch and seal joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Provide sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
2. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

G. Expansion-Joint Fittings:

1. Install in runs of aboveground PVC that are located where environmental temperature change may exceed 30 deg F (17 deg C) and that have straight-run length that exceeds 25 ft (7.6 m). Install in runs of aboveground ERMC and EMT conduit that are located where environmental temperature change may exceed 100 deg F (55 deg C) and that have straight-run length that exceeds 100 ft (30 m).
2. Install type and quantity of fittings that accommodate temperature change listed for the following locations:
    a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
    b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
    c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
    d. Attics: 135 deg F (75 deg C) temperature change.
3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
4. Install expansion fittings at locations where conduits cross building or structure expansion joints.
5. Install expansion-joint fitting with position, mounting, and piston setting selected in accordance with manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

H. Raceways Penetrating Rooms or Walls with Acoustical Requirements:

1. Seal raceway openings on both sides of rooms or walls with acoustically rated putty or firestopping.

3.04 INSTALLATION OF SURFACE RACEWAYS

A. Install surface raceways only where indicated on Drawings.

B. Install surface raceway with a minimum 2 inch (50 mm) radius control at bend points.

C. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inch (1200) mm) and with no less than two supports per straight raceway section. Support surface raceway in accordance with manufacturer's written instructions. Tape and glue are unacceptable support methods.

3.05 INSTALLATION OF BOXES AND ENCLOSURES

A. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.

B. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

C. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

D. Locate boxes so that cover or plate will not span different building finishes.

E. Support boxes in recessed ceilings independent of ceiling tiles and ceiling grid.

F. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for purpose.

G. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.

H. Set metal floor boxes level and flush with finished floor surface.

I. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

J. Do not install aluminum boxes, enclosures, or fittings in contact with concrete or earth.

K. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.

L. Boxes and Enclosures in Areas or Walls with Acoustical Requirements:

1. Seal openings and knockouts in back and sides of boxes and enclosures with acoustically rated putty.
2. Provide gaskets for wallplates and covers.

3.06 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

3.07 CLEANING

A. Boxes: Remove construction dust and debris from device boxes, outlet boxes, and floor-mounted enclosures before installing wallplates, covers, and hoods.

END OF SECTION

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SECTION 26 0544
SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

PART 2 - PRODUCTS

2.01 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. Sleeves for Rectangular Openings:

1. Material: Galvanized sheet steel.
2. Minimum Metal Thickness:
   a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
   b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.02 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel.
3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, or stainless steel of length required to secure pressure plates to sealing elements.

2.03 SLEEVE-SEAL FITTINGS

A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

2.04 GROUT

A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

2.05 SILICONE SEALANTS

A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.

B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.01 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

A. Comply with NECA 1.

B. Comply with NEMA VE 2 for cable tray and cable penetrations.

C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:

a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.

2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.

D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using cast-iron pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

3.02 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.03 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION

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SECTION 26 0553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Labels.
2. Bands and tubes.
3. Tapes and stencils.
4. Tags.
5. Signs.
6. Cable ties.
7. Miscellaneous identification products.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Comply with 29 CFR 1910.144 for color identification of hazards; 29 CFR 1910.145 for danger, caution, warning, and safety instruction signs and tags; and the following:

B. Signs, labels, and tags required for personnel safety must comply with the following standards:

1. Safety Colors: NEMA Z535.1.
2. Facility Safety Signs: NEMA Z535.2.
3. Safety Symbols: NEMA Z535.3.
4. Product Safety Signs and Labels: NEMA Z535.4.
5. Safety Tags and Barricade Tapes for Temporary Hazards: NEMA Z535.5.

C. Comply with NFPA 70E requirements for arc-flash warning labels.

D. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, must comply with UL 969.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.02 COLOR AND LEGEND REQUIREMENTS

A. Raceways and Cables Carrying Circuits at 1000 V or Less:

1. Black letters on orange field.
2. Legend: Indicate voltage.

B. Color-Coding for Conductor Identification, 1000 V or Less:

1. Color must be factory applied for sizes larger than 8 AWG.
2. Colors for 208Y/120 V Circuits:

a. Phase A: Black.
b. Phase B: Red.
c. Phase C: Blue.
d. Neutral: White.
e. Ground: Green

C. Warning Label Colors:

1. Identify system voltage with black letters on orange background.

D. Warning labels and signs must include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."

E. Equipment Identification Labels:

1. Black letters on white field.

2.03 LABELS

A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

B. Self-Adhesive Wraparound Labels: Preprinted, 3 mil (0.08 mm) thick, polyester flexible label with acrylic pressure-sensitive adhesive.

1. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over legend. Labels sized such that clear shield overlaps entire printed legend.
2. Marker for Labels:

a. Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.

C. Self-Adhesive Labels: Polyester or vinyl, thermal, transfer-printed, 3 mil (0.08 mm) thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

1. Minimum Nominal Size:

a. 1-1/2 by 6 inch (37 by 150 mm) for raceway and conductors.
b. 3-1/2 by 5 inch (76 by 127 mm) for equipment.
c. As required by authorities having jurisdiction.

2.04 TAPES AND STENCILS

A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mil (0.08 mm) thick by 1 to 2 inch (25 to 50 mm) wide; compounded for outdoor use.

C. Tape and Stencil: 4 inch (100 mm) wide black stripes on 10 inch (250 mm) centers placed diagonally over orange background and are 12 inch (300 mm) wide. Stop stripes at legends.

D. Floor Marking Tape: 2 inch (50 mm) wide, 5 mil (0.125 mm) pressure-sensitive vinyl tape, with yellow and black stripes and clear vinyl overlay.

E. Underground-Line Warning Tape:

1. Tape:

a. Recommended by manufacturer for method of installation and suitable to identify and locate underground electrical and communications utility lines.
b. Printing on tape must be permanent and may not be damaged by burial operations.
c. Tape material and ink must be chemically inert and not be subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.

2. Color and Printing:

a. Comply with APWA Uniform Color Code using NEMA Z535.1 safety colors.
b. Inscriptions for Red Tapes: "CAUTION BURIED ELECTRIC LINE BELOW".

c. Inscriptions for Orange Tapes: "CAUTION BURIED COMMUNICATION LINE BELOW".

2.05 SIGNS

A. Laminated Acrylic or Melamine Plastic Signs:

1. Engraved legend.
2. Thickness:

a. For signs up to 20 sq. inch (129 sq. cm), minimum 1/16 inch (1.6 mm) thick.
b. For signs larger than 20 sq. inch (129 sq. cm), 1/8 inch (3.2 mm) thick.
c. Self-adhesive.
d. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.06 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C) in accordance with ASTM D638: 12,000 psi (82.7 MPa).
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: Black, except where used for color-coding.

B. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C) in accordance with ASTM D638: 7000 psi (48.2 MPa).
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
5. Color: Black.

2.07 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless steel screws or stainless steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.01 PREPARATION

A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.02 INSTALLATION

A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

B. Install identifying devices before installing acoustical ceilings and similar concealment.

C. Verify identity of item before installing identification products.

D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.

E. Apply identification devices to surfaces that require finish after completing finish work.

F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.

G. System Identification for Raceways and Cables under 1000 V: Identification must completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.

1. Secure tight to surface of conductor, cable, or raceway.

H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

I. Emergency Operating Instruction Signs: Install instruction signs with white legend on red background with minimum 3/8 inch (10 mm) high letters for emergency instructions at equipment used for power transfer.

J. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from floor.

K. Accessible Fittings for Raceways: Identify cover of junction and pull box of the following systems with wiring system legend and system voltage. System legends must be as follows:

1. "EMERGENCY POWER."

L. Vinyl Wraparound Labels:

1. Secure tight to surface of raceway or cable at location with high visibility and accessibility.
2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to location and substrate.

M. Self-Adhesive Wraparound Labels: Secure tight to surface at location with high visibility and accessibility.

N. Self-Adhesive Labels:

1. Install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
2. Unless otherwise indicated, provide single line of text with 1/2 inch (13 mm) high letters on 1-1/2 inch (38 mm) high label; where two lines of text are required, use labels 2 inch (50 mm) high.

O. Marker Tapes: Secure tight to surface at location with high visibility and accessibility.

P. Self-Adhesive Vinyl Tape: Secure tight to surface at location with high visibility and accessibility.

1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for minimum distance of 6 inch (150 mm) where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.

Q. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.

R. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's instructions.

S. Underground Line Warning Tape:

1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inch (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in common trench exceeds 16 inch (400 mm) overall.
2. Install underground-line warning tape for direct-buried cables and cables in raceways.

T. Laminated Acrylic or Melamine Plastic Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.
2. Unless otherwise indicated, provide single line of text with 1/2 inch (13 mm) high letters on 1-1/2 inch (38 mm) high sign; where two lines of text are required, use labels 2 inch (50 mm) high.

U. Cable Ties: General purpose, for attaching tags, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

3.03 IDENTIFICATION SCHEDULE

A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.

B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.

C. Accessible Fittings for Raceways and Cables within Buildings: Identify cover of junction and pull box of the following systems with self-adhesive labels containing wiring system legend and system voltage. System legends must be as follows:

1. "EMERGENCY POWER."

D. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with conductor or cable designation, origin, and destination.

E. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive labels with conductor designation.

F. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.

G. Workspace Indication: Apply floor marking tape to finished surfaces. Show working clearances in direction of access to live parts. Workspace must comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

H. Instructional Signs: Self-adhesive labels, including color code for grounded and ungrounded conductors.

I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Laminated acrylic or melamine plastic signs.

1. Apply to exterior of door, cover, or other access.
2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:

a. Power-transfer switches.
b. Controls with external control power connections.

J. Operating Instruction Signs: Laminated acrylic or melamine plastic signs.

K. Emergency Operating Instruction Signs: Laminated acrylic or melamine plastic signs with white legend on red background with minimum 3/8 inch (10 mm) high letters for emergency instructions at equipment used for power transfer.

L. Equipment Identification Labels:

1. Indoor Equipment: Laminated acrylic or melamine plastic sign].

2. Outdoor Equipment: Laminated acrylic or melamine sign.

END OF SECTION

SECTION 26 0943
LIGHTING CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Complete and operable lighting control system with wired and wireless components.
    a. System requirements.
    b. System software interfaces.

B. Related Sections:

1. Section 26 0533: Raceways and Boxes for Electrical Systems.
2. Section 26 2726: Wiring Devices.
3. Section 26 5000: Light Fixtures.

C. Basis of Design: Acuity.

1.2 QUALITY ASSURANCE

A. The equipment supplied shall be new and free from defects and be 100% factory tested.

B. Comply with the most current addition and applicable standards as follows:

1. 47 CFR 15 - Radio Frequency Devices.
2. ANSI/ESD S20.20 - Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices).
3. ASTM D4674 - Standard Practice for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environments.
4. CSA C22.2 No. 223 – Power Supplies with Extra-low-voltage Class 2 Outputs.
5. IEC 61000-4-2 - Electromagnetic Compatibility (EMC) - Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test.
6. IEEE 1789 - Recommended Practice for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers.
7. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits.
8. ISO 9001 - Quality Management Systems-Requirements.
9. NECA 1 - Standard for Good Workmanship in Electrical Construction.
10. NECA 130 - Standard for Installing and Maintaining Wiring Devices; National Electrical Contractors Association.
11. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; National Electrical Manufacturers Association.
12. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association.
13. NFPA 70 - National Electrical Code; National Fire Protection Association.
14. UL 20 - General-Use Snap Switches.
15. UL 508 - Industrial Control Equipment; Underwriters Laboratories Inc.
16. UL 924 - Emergency Lighting and Power Equipment.
17. UL 1310 – Class 2 Power Units.
18. UL 1472 - Solid-State Dimming Controls.
19. UL 2043 - Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces.
20. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products.

C. Manufacturer Qualifications:

1. Company with not less than ten years of experience manufacturing lighting control products using wireless communication between devices.
2. Registered to ISO 9001, including in-house engineering for product design activities.
3. Provides factory direct technical support hotline available 24 hours per day, 7 days per week.

1.3 ADMINISTRATIVE REQUIREMENTS

A. The contractor shall be responsible for coordinating with system supplier all equipment and cabling requirements for a complete and operable system prior to submitting bid. The supplier shall provide a summary of cable required for all components of the system to the Contractor during the bid phase so the Contractor can estimate and include a complete system price in his bid.

B. Coordinate, receive, mount, connect, and place into operation all equipment related to lighting controls. This Contractor shall furnish all conduit, wire, connectors, hardware, and other incidental items necessary for the complete and proper operation of the lighting control system and controls as described herein and shown on the drawings.

C. Coordination:

1. Coordinate the placement of sensors and wall controls with millwork, furniture, equipment, etc. installed under other sections or by others.
2. Coordinate the placement of wall controls with actual installed door swings.
3. Coordinate the placement of daylight sensors with windows, skylights, and luminaires to achieve optimum operation. Coordinate placement with ductwork, piping, equipment, or other potential obstructions to light level measurement installed under other sections or by others.
4. Coordinate the work to provide luminaires and lamps compatible with the lighting controls to be installed.
5. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

D. Sequencing:

1. Do not install sensors and wall controls until final surface finishes and painting is complete.

E. Project Conditions: Maintain field conditions within manufacturer's required service conditions during and after installation.

1. Basis of Design System Requirements:

a. Ambient Temperature: 32-deg F to 104-deg F.
b. Relative Humidity: Less than 90 percent, non-condensing.
c. Protect equipment from dust.

1.4 SHOP DRAWING SUBMITTALS

A. Shop Drawings:

1. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.

a. Occupancy/Vacancy Sensors: Include detailed basic motion detection coverage range diagrams.
b. Wall Dimmers: Include derating information for ganged multiple devices.

2. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

B. Operation and Maintenance Manuals:

1. Include detailed information on lighting control system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
2. Project Record Documents: Record actual installed locations and settings for lighting control system components.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.6 WARRANTY

A. Manufacturer’s standard warranty, without Manufacturer full scope start-up:

1. Manufacturer Lighting Control System Components, ballasts/drivers, and ballasts/modules: One year, 100 percent parts coverage (manufacturer provides no labor coverage.

B. Labor Warranty: Electrical Contractor shall provide 100 percent labor warranty for a period of one year from date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Cooper Lighting Controls.

B. Other Manufacturer’s approved for bidding:

1. Acuity.
2. Hubbell.
3. Manufacturer’s with equivalent products shall submit for prior approval.

C. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2.2 LIGHTING CONTROLS GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) as suitable for the purpose indicated.

B. Design lighting control equipment for 10-year operational life while operating continually at any temperature in an ambient temperature range of 32 degrees F (0 degrees C) to 104 degrees F (40 degrees C) and 90 percent non-condensing relative humidity.

C. Electrostatic Discharge Tolerance: Design and test equipment to withstand electrostatic discharges without impairment when tested according to IEC 61000-4-2.

D. Power Failure Recovery: When power is interrupted for periods up to 10-years and subsequently restored, lights to automatically return to same levels (dimmed settings, full on, or full off) as prior to power interruption.

2.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Refer to details on the drawings for system components and intended functionality.

2.4 SYSTEMS SOFTWARE INTERFACES

A. The system shall allow users to program and manage the system via a mobile app and latest web browser from Apple, Googe and Microsoft.

B. Provide on-site programming and commissioning by a factory authorized technician.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that ratings and configurations of system components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive system components.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130.

B. Install products in accordance with manufacturer's instructions.

C. Sensor locations: Sensor locations indicated are diagrammatic. Within the design intent, reasonable minor adjustments to locations may be made in order to optimize coverage and avoid conflicts or problems affecting coverage, in accordance with manufacturer's recommendations.

D. Ensure that daylight sensor placement minimizes sensor view of electric light sources. Locate ceiling-mounted and luminaire-mounted daylight sensors to avoid direct view of luminaires.

E. Lamp Burn-In: Operate lamps at full output for prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

F. Identify system components in accordance with Section 26 0553.

3.3 FIELD QUALITY CONTROL

A. This Contractor shall provide a complete set of as-built drawings to indicating device locations and addresses (where applicable). These drawings shall be prepared and verified prior to commissioning of the system. These drawings shall be submitted in the Operation and Maintenance Manuals.

B. This Contractor shall coordinate factory requirements for system commissioning and coordinate schedule of commissioning.

C. System Start-Up and Commissioning: Manufacturer shall provide a factory authorized technician to confirm proper installation and operation of all lighting control system components. The startup requirement is intended to verify:

1. Connection of power wiring and load circuits.
2. Connection and location of controls.
3. Energize wireless hubs.
4. Associate occupancy/vacancy sensors, daylight sensors, wireless remotes, and wall stations to load control devices.
5. Provide initial rough calibration of sensors.
6. Program timeclock schedules per approved sequence of operations.
7. Verify system operation control by control.
8. Obtain sign-off on system functions.
9. Train Owner’s representative on system capabilities, operation, and maintenance.

D. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

E. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

F. Protect installed products from subsequent construction operations.

3.4 CLOSEOUT ACTIVITIES

A. Closeout Submittals: Refer to Section 017800 Closeout Submittals for requirements.

B. Demonstration: At a minimum, provide the following for Owner's Representative and/or Architect/Engineer:

1. Proper operation of lighting control devices and how to correct deficiencies or make adjustments.
2. On-Site Performance Verification (to occur at same time as training and system start-up services).

C. Training to include, but not be limited to, the following:

1. Manufacturer's certified service representative to perform on-site training of Owner's personnel on operation, adjustment, and maintenance of lighting control system as part of on-site system start-up services.

END OF SECTION

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SECTION 26 2416
PANELBOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Lighting and appliance branch-circuit panelboards.

1.02 SUMMARY

A. Furnish, install, and connect panelboards.

B. Reference numbers indicated on drawings shall be used to establish quality, interrupting capacity, maximum dimensions, etc. This does not exclude other manufacturers from bidding.

1.03 DEFINITIONS

A. MCCB: Molded-case circuit breaker.

B. SPD: Surge protective device.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of panelboard.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of NRTL listing for series rating of installed devices.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include wiring diagrams for power, signal, and control wiring.

1.05 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.06 FIELD CONDITIONS

A. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet (2000 m).

1.07 QUALITY ASSURANCE

A. All equipment shall be new and of current production of a national firm which manufactures panelboards. There shall be one-source responsibility for warranty, parts, and service through a local representative with factory-trained service personnel. All switchgear including, but not limited to, switchboards, panelboards, and disconnect switches shall be by the same manufacturer.

1.08 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.

1. Panelboard Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:

1. Square D (Schneider Electric) Co.
2. Siemens ITE.
3. Eaton.

B. Products of other manufacturers may be provided based on Engineer prior approval only.

2.02 PANELBOARDS COMMON REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA PB 1.

C. Comply with NFPA 70.

D. Enclosures: Flush or surface-mounted, dead-front cabinets.

1. Rated for environmental conditions at installed location.

a. Outdoor Locations: NEMA 250, Type 3R.

2. Height: 84 inches (2.13 m) maximum.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.

E. Incoming Mains Location: Convertible between top and bottom.

F. Phase, Neutral, and Ground Buses: Hard-drawn copper, 98 percent conductivity.

1. Aluminum bus is acceptable.

G. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.

a. Where bus is aluminum, aluminum lugs are acceptable.

2. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
3. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

H. Future Devices: Panelboards shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

I. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include label or manual with size and type of allowable upstream and branch devices listed and labeled by an NRTL for series-connected short-circuit rating.

J. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

2.03 POWER PANELBOARDS

A. Panelboards: NEMA PB 1, distribution type.

B. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inches (914 mm) high, provide two latches, keyed alike.

C. Mains: Circuit breaker or Lugs only, refer to panel schedules on the drawings.

D. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers or plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers or plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2.04 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

B. Mains: Circuit breaker or lugs only. Refer to panel schedules on the drawings.

C. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

D. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.05 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. MCCB: Comply with UL 489, with series-connected rating or fully rated interrupting capacity (refer to panel schedules) to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers:

    a. Inverse time-current element for low-level overloads.
    b. Instantaneous magnetic trip element for short circuits.
    c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic Trip Circuit Breakers:

    a. RMS sensing.
    b. Field-replaceable rating plug or electronic trip.
    c. Digital display of settings, trip targets, and indicated metering displays.
    d. Multi-button keypad to access programmable functions and monitored data.
    e. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused the trip.
    f. Integral test jack for connection to portable test set or laptop computer.
    g. Field-Adjustable Settings:

        1) Instantaneous trip.
        2) Long- and short-time pickup levels.
        3) Long and short time adjustments.
        4) Ground-fault pickup level, time delay, and I squared T response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
6. GFEP Circuit Breakers: Class B ground-fault protection (30-mA trip).
7. Subfeed Circuit Breakers: Vertically mounted.
8. MCCB Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.
    b. Breaker handle indicates tripped status.
    c. UL listed for reverse connection without restrictive line or load ratings.
    d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.

e. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
f. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in off position.

2.06 IDENTIFICATION

A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.

B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.

C. Circuit Directory: Directory card inside panelboard door, mounted in transparent card holder.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with NECA 1.

B. Install panelboards and accessories according to NEMA PB 1.1.

C. Mount top of trim 78 inches (1981 mm) above finished floor unless otherwise indicated.

D. Mount panelboard cabinet plumb and rigid without distortion of box.

E. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

F. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

G. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, and connections to separate ground bars.

H. Install filler plates in unused spaces.

I. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.02 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

D. Install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems" identifying source of remote circuit.

3.03 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Panelboards will be considered defective if they do not pass tests and inspections.

D. Inspect equipment for damage. Touch-up scratches and mars with factory provided touch-up paint.

E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION

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SECTION 26 2726
WIRING DEVICES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Wiring device material and installation requirements.

1.02 SUMMARY

A. Furnish, install, and connect wiring devices and cover plates.

B. All devices and plates shall be of one manufacturer as much as possible.

1.03 QUALITY ASSURANCE

A. All devices shall conform to most current applicable Federal Specifications, UL, and NEMA where such specification exists for the type of device furnished.

1.04 SUBMITTALS

A. Provide shop drawings submittals consisting of manufacturer's specification data sheets as indicated in Section 26 0500.

B. Operations and Maintenance Manuals: Provide data sheets and maintenance information. Refer to Section 26 0000.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Devices shall be manufactured by one of the following:
1. Hubbell.
2. Cooper Industries.
3. Pass & Seymour (P & S).
4. Bryant.
5. Leviton.

2.02 DEVICES

A. Straight Blade Receptacles:
1. Specification grade rated 125 volts, 20 amperes.
2. NEMA 5-20R configuration.
3. Tamper Resistant type.
4. Hubbell or equivalent.

B. Ground fault circuit interrupter (GFCI) receptacles:
1. Specification grade rated 125-volts, 20-amperes, tamper resistant type.
2. NEMA 5-20R configuration.
3. Capable of protecting downstream devices and protection against line and load reversal.
4. LED indicator light, green to indicate power and proper operation, red to indicate trip condition.
5. Continuous self-test functionality and disconnects power to receptacle if critical components are damaged and GFCI protection is lost.
6. Standard GFCI: Hubbell GFRST20 or equivalent.
7. Weather resistant rated as required by NEC 406.9. Hubbell GFWRST20 or equivalent.

C. USB Charger Receptacles:
1. Specification grade, tamper resistant.
2. NEMA 5-20R configuration duplex 125-volt receptacle, 20-ampere.
3. One USB 2.0 3-amp, 5-volts DC port and one Type C USB port.

D. Switches:

1. Specification grade heavy-duty.
2. Rated 120 or 277 volts, 20 amperes.
3. Hubbell 1221 or equivalent.

E. Special devices shall be as noted on drawings.

F. Color: White. Devices installed in finished ceilings (i.e. gyp board or ACT) shall be of a color that matches finish or as approved by Architect.

2.03 COVER PLATES

A. Interior finished spaces: One piece, 0.035" thick, satin-finish Type 302 stainless steel.

B. Exterior device covers:
1. In-use type, weatherproof and gasketed, metal cover, gray.
2. Single-gang, mount vertically.
3. Red Dot Code Keeper or equivalent.

C. Exterior soffit receptacles: Provide flip cover with gasket, color to be black.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install wiring devices and accessories as recommended by manufacturer's written instructions. Installation shall comply with NECA and the National Electrical Code in accordance with recognized industry practices.

B. Clean debris from outlet box prior to installation of device.

C. Coordinate installation of devices with other trades. Protect installed devices from being discolored or damaged by finish contractors such as painters, etc.

D. Install devices plumb and flush with wall finish.

E. Install switches on the strike side of door or on swing side (clear of door swing) as indicated on the drawings with OFF position down.

F. Ground fault circuit interrupter receptacles shall be installed in readily accessible locations. Where device location is not readily accessible, a standard receptacle may be installed and protected by a GFCI type circuit breaker. GFCI receptacles shall be installed in a non-feed thru method.

G. Arrange receptacle devices with long dimension vertical and grounding pole on bottom. Group adjacent switches under single, multi-gang wall plates.
1. Devices installed in surface raceways shall be installed as required by surface raceway.
2. Devices above countertops may be installed horizontally if space does not allow for vertical installation. Coordinate with Architectural elevations and General Contractor.
3. Where devices are installed horizontally, ground pole shall be on the right.

H. Where three or more switches are ganged in a single box, and where specified on the drawings, identify each switch with approved legend engraved on wall plate.

I. Connect wiring device grounding terminal to outlet box with bonding jumper.

J. Install wall plates when painting is complete. Wall plates shall cover box cutout entirely. Wall and finishes shall be repaired where wall plate does not cover rough opening. Oversized wall plates are not acceptable.

K. Apply identification on receptacle faceplates. Refer to Section 26 0553.

L. Provide and install a blank cover for all unused junction boxes.

3.02 TESTING/FINAL ACCEPTANCE

A. Test wiring devices for proper polarity and ground continuity. Correct malfunctioning units.

B. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.

C. Replace damaged or defective components.

D. Receptacles used for temporary power during construction shall be replaced with new prior to final acceptance.

E. Wiring devices shall be clean and free from drywall mud, paint, etc. prior to final acceptance.

END OF SECTION

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SECTION 26 2813
FUSES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Cartridge fuses rated 600 V ac and less for use in the following:
      a. Control circuits.
      b. Motor-control centers.
      c. Panelboards.
      d. Switchboards.
      e. Enclosed controllers.
      f. Enclosed switches.

1.02 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.03 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:
   1. Cooper Bussman.
   2. Merzen-Ferraz/Shawmut.
   3. LittelFuse.

2.02 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
   1. Type RK-1: 250 or 600-V, zero- to 600-A rating, 200 kAIC, time delay.
   2. Type RK-5: 250 or 600-V, zero- to 600-A rating, 200 kAIC, time delay.
   3. Type CC: 600-V, zero- to 30-A rating, 200 kAIC, fast acting.
   4. Type CD: 600-V, 31- to 60-A rating, 200 kAIC, fast acting.
   5. Type J: 600-V, zero- to 600-A rating, 200 kAIC.

B. 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.

C. Comply with NEMA FU 1 for cartridge fuses.

D. Comply with NFPA 70.

E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

F. Spare Fuses: Provide 10% of each type and size fuse but not less than one set of each size. Turn over to Owner.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

3.02 IDENTIFICATION

A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION

SECTION 26 2816
ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Fusible switches.
2. Nonfusible switches.
3. Molded-case circuit breakers (MCCBs).
4. Molded-case switches.
5. Enclosures.

1.02 ACTION SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1.03 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.04 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.
1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

C. Comply with NFPA 70.

2.02 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:
1. Square D.
2. Eaton.
3. Siemens.

2.03 FUSIBLE SWITCHES

A. Type HD, Heavy Duty:
1. Single throw.
2. Three pole.
3. 240 or 600-V ac.
4. Ratings as indicated on drawings.
5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate fuses.
6. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

B. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

3. Service-Rated Switches: Labeled for use as service equipment where required.

2.04 NONFUSIBLE SWITCHES

A. Type HD, Heavy Duty, Three Pole, Single Throw, 240 or 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

B. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.

2.05 MOLDED-CASE CIRCUIT BREAKERS

A. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components shall be completely isolated from the handle and the accessory mounting area.

B. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with a push-to-trip button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.

C. MCCBs shall be equipped with a device for locking in the isolated position.

D. Lugs shall be suitable for 167 deg F (75 deg C) rated wire, temperature rating in NFPA 70.

E. Standards: Comply with UL 489 with interrupting capacity to comply with available fault currents.

F. Thermal-Magnetic Circuit Breakers: Inverse time-current thermal element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

G. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

H. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
1. Long- and short-time pickup levels.
2. Long- and short-time time adjustments.
3. Ground-fault pickup level, time delay, and I-squared t response.

I. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.

J. Features and Accessories:
1. Standard frame sizes, trip ratings, and number of poles.
2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.

2.06 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

B. Enclosure Finish: The enclosure shall be finished with gray baked enamel paint, electrodeposited on cleaned, phosphatized steel.

C. Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts. NEMA 250 Types 7 and 9 enclosures shall be provided with threaded conduit openings in both endwalls.

D. Operating Mechanism: The circuit-breaker operating handle shall be externally operable with the operating mechanism being an integral part of the box, not the cover. The cover interlock

mechanism shall have an externally operated override. The override shall not permanently disable the interlock mechanism, which shall return to the locked position once the override is released. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.

E. Enclosures designated as NEMA 250 Type 4, 4X stainless steel, 12, or 12K shall have a dual cover interlock mechanism to prevent unintentional opening of the enclosure cover when the circuit breaker is ON and to prevent turning the circuit breaker ON when the enclosure cover is open.

F. NEMA 250 Type 7/9 enclosures shall be furnished with a breather and drain kit to allow their use in outdoor and wet location applications.

PART 3 - EXECUTION

3.01 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
   1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
   2. Outdoor Locations: NEMA 250, Type 3R.
   3. Hazardous Areas: NEMA 250, rated as required for the classification.

3.02 INSTALLATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

C. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."

D. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

E. Install fuses in fusible devices.

F. Comply with NFPA 70 and NECA 1.

3.03 IDENTIFICATION

A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
   1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
   2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.04 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections for Switches: Test switches in accordance with manufacturer’s recommendations.
   1. Visual and Mechanical Inspection:
      a. Inspect physical and mechanical condition.
      b. Inspect anchorage, alignment, grounding, and clearances.
      c. Verify that the unit is clean.
      d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
      e. Verify that fuse sizes and types match the Specifications and Drawings.
      f. Verify that each fuse has adequate mechanical support and contact integrity.

C. Tests and Inspections for Molded Case Circuit Breakers: Test circuit breakers in accordance with manufacturer's recommendations.
   1. Visual and Mechanical Inspection:
      a. Inspect physical and mechanical condition.
      b. Inspect anchorage, alignment, grounding, and clearances.
      c. Verify that the unit is clean.
      d. Operate the circuit breaker to ensure smooth operation.
   2. Ensure switches and circuit breakers operate properly. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
   3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

END OF SECTION

SECTION 26 3200
GAS-ENGINE-DRIVEN GENERATOR SETS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes packaged engine generators for non-emergency use with the following features:

1. Natural gas engine.
2. Gaseous fuel system.
3. Control and monitoring.
4. Generator overcurrent and fault protection.
5. Generator, exciter, and voltage regulator.
6. Vibration isolation devices.

B. Related Requirements:

1. Section 263600 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine generators.

1.02 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include plans and elevations for engine generator and other components specified.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Identify fluid drain ports and clearance requirements for proper fluid drain.
4. Design calculations for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
5. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include base weights.
6. Include diagrams for power, signal, and control wiring. Complete schematic, wiring, and interconnection diagrams showing terminal markings for EPS equipment and functional relationship between all electrical components.

1.03 SHOP DRAWINGS/SUBMITTALS

A. submittals shall include, but not be limited to, the following:

1. Specification sheets indicating all standard and optional equipment.
2. Generator Sizing Report.
3. Prototype test certification.
4. Dimensioned drawings, including enclosure and transfer switch (when installed in the generator enclosure).
5. Schematic wiring diagrams and interconnection diagrams identifying, by terminal number, each required interconnection between the generator set and the transfer switch.
6. Recommended concrete pad detailing dimensions and required openings.
7. Enclosure details, elevations, dimensions, etc.

B. Sample warranty.

1.04 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.05 QUALITY ASSURANCE

A. The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and regulations, including ANSI, ISO, UL, IEEE, NEMA, and NFPA.

1. NFPA 110, Emergency and Standby Power Systems.

B. All equipment shall be new and of current production of a national firm which manufactures the generator and controls, transfer switch, and assembles the standby generator sets as a matched unit. There shall be one-source responsibility for warranty, parts, and service through a local representative with factory-trained service personnel

C. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

D. Testing Agency Qualifications: Factory authorized technician.

1.06 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Source Limitations: Obtain packaged engine generators and auxiliary components through one source from a single manufacturer.

B. Subject to compliance with requirements, provide products by one of the following:

1. Caterpillar.
2. MTU On Site Energy.
3. Kohler.

2.02 PERFORMANCE REQUIREMENTS

A. B11 Compliance: Comply with B11.19.

B. NFPA Compliance:

1. Comply with NFPA 37.
2. Comply with NFPA 70.
3. Comply with NFPA 110 requirements for Level 2 EPSS.

C. Engine Exhaust Emissions: Comply with EPA Tier 4 requirements and applicable state and local government requirements.

D. Noise Emission: Maximum noise level of 77 dBA at 7 meters in any direction due to sound emitted by engine generator including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

E. Environmental Conditions: Engine generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: Subject to outside temperatures at location installed.
2. Altitude: Sea level to 1000 feet (300 m).

2.03 ENGINE GENERATOR ASSEMBLY DESCRIPTION

A. Factory-assembled and -tested, water-cooled engine, with brushless generator and accessories.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency acceptable to authorities having jurisdiction, and marked for intended location and use.

C. Power Rating: Standby.

D. EPSS Class: Engine generator shall be classified as Class 48 according to NFPA 110.

E. Ratings: See drawings.

F. Power Factor: 0.8, lagging.

G. Frequency: 60 Hz.

H. Induction Method: Naturally aspirated.

I. Governor: Adjustable isochronous, with speed sensing.

J. Mounting Frame: Structural steel framework to maintain alignment of mounted components without depending on concrete foundation. Provide lifting attachments sized and spaced to prevent deflection of base during lifting and moving.

1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.

K. Capacities and Characteristics:

1. Power Output Ratings: Nominal ratings as indicated at 0.8 power factor excluding power required for the continued and repeated operation of the unit and auxiliaries.
2. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

L. Engine Generator Performance:

1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a three-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start Time:

a. Comply with NFPA 110, Type 10 system requirements.

2.04 GAS ENGINE

A. Fuel: Natural gas.

B. Rated Engine Speed: 1800 rpm.

C. Lubrication System: Engine or skid-mounted.

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

D. Jacket Coolant Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with UL 499.

E. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine generator mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.
    a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
    b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

F. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 25 dB at 500 Hz.
2. Sound level measured at a distance of 25 feet (8 m) from exhaust discharge after installation is complete shall be 77 dBA or less.

G. Air-Intake Filter: Standard-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

H. Starting System: 12-V electric, with negative ground.

1. Components: Sized so they are not damaged during a full engine-cranking cycle with ambient temperature at maximum specified in "Performance Requirements" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.
4. Battery: Lead acid, with capacity within ambient temperature range specified in "Performance Requirements" Article to provide specified cranking cycle at least twice without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 50 deg F (10 deg C) regardless of external ambient temperature within range specified in "Performance Requirements" Article. Include accessories required to support and fasten batteries in place. Provide ventilation to exhaust battery gases.

7. Battery Stand: Factory-fabricated, two-tier metal with acid-resistant finish designed to hold the quantity of battery cells required and to maintain the arrangement to minimize lengths of battery interconnections.
8. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35 A minimum continuous rating.
9. Battery Charger: Current-limiting, automatic-equalizing and float-charging type designed for lead-acid batteries. Unit shall comply with UL 1236 and include the following features:

    a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
    b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg F (minus 40 deg C) to 140 deg F (plus 60 deg C) to prevent overcharging at high temperatures and undercharging at low temperatures.
    c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
    d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
    e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
    f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.05 GASEOUS FUEL SYSTEM

A. Natural Gas Piping: Coordinate with Mechanical.

B. Gas Train: Comply with NFPA 37.

C. Engine Fuel System:

D. Natural Gas, Vapor-Withdrawal System:

1. Carburetor.
2. Fuel-Shutoff Solenoid Valves: NRTL-listed, normally closed, safety shutoff valves; one for each fuel source.
3. Fuel Filters: One for each fuel type.
4. Manual Fuel Shutoff Valves: One for each fuel type.
5. Flexible Fuel Connectors: Minimum one for each fuel connection.
6. Fuel change gas pressure switch.

2.06 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of engine generator. When mode-selector switch is switched to the on position, engine generator starts. The off position of same switch initiates generator-set shutdown. When engine generator is running, specified system or equipment failures or derangements automatically shut down engine generator and initiate alarms.

B. Provide minimum run time control set for 15 minutes with override only by operation of a remote emergency-stop switch.

C. Comply with UL 508A.

D. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the engine

generator. Mounting method shall isolate the control panel from generator-set vibration. Panel shall be powered from the engine generator battery.

E. Control and Monitoring Panel:

1. Digital controller with integrated LCD, controls, and microprocessor, capable of local and remote control, monitoring, and programming, with battery backup.
2. Instruments: Located on the control and monitoring panel and viewable during operation.

    a. Engine lubricating-oil pressure gage.
    b. Engine-coolant temperature gage.
    c. DC voltmeter (alternator battery charging).
    d. Running-time meter.
    e. AC voltmeter, for each phase.
    f. AC ammeter, for each phase.
    g. AC frequency meter.
    h. Generator-voltage adjusting rheostat.

3. Controls and Protective Devices: Controls, shutdown devices, and common visual alarm indication, including the following:

    a. Cranking control equipment.
    b. Run-Off-Auto switch.
    c. Control switch not in automatic position alarm.
    d. Overcrank alarm.
    e. Overcrank shutdown device.
    f. Low water temperature alarm.
    g. High engine temperature prealarm.
    h. High engine temperature.
    i. High engine temperature shutdown device.
    j. Overspeed alarm.
    k. Overspeed shutdown device.
    l. Coolant low-level alarm.
    m. Coolant low-level shutdown device.
    n. Coolant high-temperature prealarm.
    o. Coolant high-temperature alarm.
    p. Coolant low-temperature alarm.
    q. Coolant high-temperature shutdown device.
    r. EPS supplying load indicator.
    s. Battery high-voltage alarm.
    t. Low cranking voltage alarm.
    u. Battery-charger malfunction alarm.
    v. Battery low-voltage alarm.
    w. Lamp test.
    x. Contacts for local and remote common alarm.
    y. Low-starting air pressure alarm.
    z. Low-starting hydraulic pressure alarm.
    aa. Remote manual stop shutdown device.
    bb. Air shutdown damper alarm when used.
    cc. Air shutdown damper shutdown device when used.
    dd. Hours of operation.
    ee. Engine generator metering, including voltage, current, Hz, kW, kVA, and power factor.
    ff. Generator overcurrent protective device not closed alarm.

F. Common Remote Panel with Common Audible Alarm: Include necessary contacts and terminals in control and monitoring panel. Remote panel shall be powered from the engine generator battery.

G. Remote Alarm Annunciator: An LED indicator light labeled with proper alarm conditions shall identify each alarm event, and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

1. Overcrank alarm.
2. Coolant low-temperature alarm.
3. High engine temperature prealarm.
4. High engine temperature alarm.
5. Low lube oil pressure alarm.
6. Overspeed alarm.
7. Low fuel main tank alarm.
8. Low coolant level alarm.
9. Low cranking voltage alarm.
10. Contacts for local and remote common alarm.
11. Audible-alarm silencing switch.
12. Air shutdown damper when used.
13. Run-Off-Auto switch.
14. Control switch not in automatic position alarm.
15. Fuel tank derangement alarm.
16. Fuel tank high-level shutdown of fuel supply alarm.
17. Lamp test.
18. Low cranking voltage alarm.
19. Generator overcurrent protective device not closed.

H. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

I. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

2.07 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Overcurrent protective devices shall be coordinated to optimize selective tripping when a short circuit occurs.

1. Overcurrent protective devices for the entire EPSS shall be coordinated to optimize selective tripping when a short circuit occurs. Coordination of protective devices shall consider both utility and EPSS as the voltage source.
2. Overcurrent protective devices for the EPSS shall be accessible only to authorized personnel.

B. Generator Circuit Breaker: Molded-case, electronic-trip type; 100 percent rated; complying with UL 489.

1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
2. Trip Settings: Selected to coordinate with generator thermal damage curve.
3. Shunt Trip: Connected to trip breaker when engine generator is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

2.08 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required. Provide 12 lead alternator.

E. Range: Provide limited range of output voltage by adjusting the excitation level.

F. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

G. Enclosure: Dripproof.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified and as required by NFPA 110.

1. Adjusting Rheostat on Control and Monitoring Panel: Provide plus or minus 5 percent adjustment of output-voltage operating band.
2. Maintain voltage within 15 percent on one step, full load.
3. Provide anti-hunt provision to stabilize voltage.
4. Maintain frequency within 5 percent and stabilize at rated frequency within 2 seconds.

I. Subtransient Reactance: 12 percent, maximum.

2.09 VIBRATION ISOLATION DEVICES

A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.

B. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Minimum Deflection: 1 inch (25 mm).

C. Vibration isolation devices shall not be used to accommodate misalignments or to make bends.

2.10 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine generator using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with IEEE 115.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify Architect/Construction Manager no fewer than two working days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Owner's written permission.

B. Comply with NECA 1 and NECA 404.

C. Comply with packaged engine generator manufacturers' written installation and alignment instructions and with NFPA 110.

D. Equipment Mounting:

1. Install packaged engine generators on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
2. Coordinate size and location of concrete bases for packaged engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
3. Install packaged engine generator with elastomeric isolator pads or restrained spring isolators having a minimum deflection of 1 inch (25 mm) on 4-inch- (100-mm-) high concrete base. Secure engine generator to anchor bolts installed in concrete bases.

E. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

F. Exhaust System: Install Schedule 40, black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet.

G. Drain Piping: Install condensate drain piping to muffler drain outlet with a shutoff valve, stainless-steel flexible connector, and Schedule 40, black steel pipe, the full size of the drain connection, with welded joints.

H. Gaseous Fuel Piping: Coordinate with Mechanical Contractor.

I. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.02 CONNECTIONS

A. Gaseous Fuel Connections:

1. Connect fuel piping to engines with a gate valve and union and flexible connector.
2. Install manual shutoff valve in a remote location to isolate gaseous fuel supply to the generator.
3. Vent gas pressure regulators outside building a minimum of 60 inches (1500 mm) from building openings.

B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

C. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Provide a minimum of one 90-degree bend in flexible conduit routed to the engine generator from a stationary element.

D. Balance single-phase loads to obtain a maximum of 10 percent unbalance between any two phases.

3.03 IDENTIFICATION

A. Identify system components according to Section 260553 "Identification for Electrical Systems."

B. Install a sign indicating the generator neutral is bonded to the main service neutral at the main service location.

3.04 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections with the assistance of a factory-authorized service representative.

C. Tests and Inspections:

1. Perform tests recommended by manufacturer and each visual and mechanical inspection and electrical and mechanical test listed in the first two subparagraphs below as specified in the NETA ATS. Certify compliance with test parameters.
    a. Visual and Mechanical Inspection
        1) Compare equipment nameplate data with drawings and specifications.
        2) Inspect physical and mechanical condition.
        3) Inspect anchorage, alignment, and grounding.
        4) Verify the unit is clean.
    b. Electrical and Mechanical Tests
        1) Perform insulation-resistance tests in accordance with IEEE 43.
            a) Machines 200 hp (150 kW) or less. Test duration shall be one minute. Calculate the dielectric-absorption ratio.
        2) Test protective relay devices.
        3) Verify phase rotation, phasing, and synchronized operation as required by the application.
        4) Functionally test engine shutdown for low oil pressure, overtemperature, overspeed, and other protection features as applicable.
        5) Perform vibration test for each main bearing cap.
        6) Verify correct functioning of the governor and regulator.
2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here, including, but not limited to, single-step full-load pickup test.
3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
    a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    c. Verify acceptance of charge for each element of the battery after discharge.
    d. Verify that measurements are within manufacturer's specifications.
4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine generator system before and during system operation. Check for air, exhaust, and fluid leaks.
6. Exhaust Emissions Test: Comply with applicable government test criteria.
7. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
8. Harmonic-Content Tests: Measure harmonic content of output voltage at 25 percent and 100 percent of rated linear load. Verify that harmonic content is within specified limits.
9. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at four locations 25 feet (8 m) from edge of the generator enclosure, and compare measured levels with required values.

D. Coordinate tests with tests for transfer switches and run them concurrently.

E. Test instruments shall have been calibrated within the past 12 months, traceable to NIST Calibration Services, and adequate for making positive observation of test results. Make calibration records available for examination on request.

F. Leak Test: After installation, charge exhaust, coolant, and fuel systems and test for leaks. Repair leaks and retest until no leaks exist.

G. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation for generator and associated equipment.

H. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

I. Remove and replace malfunctioning units and retest as specified above.

J. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

K. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

3.05 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

END OF SECTION

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SECTION 26 3600
TRANSFER SWITCHES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes automatic transfer switches rated 600 V and less.

1.02 QUALITY ASSURANCE

A. All equipment shall be new and of current production of a national firm which manufactures the generator and controls, transfer switch, and assembles the standby generator sets as a matched unit. There shall be one-source responsibility for warranty, parts, and service through a local representative with factory-trained service personnel.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
2. Single-Line Diagram: Show connections between transfer switch, power sources, and load.

1.04 INFORMATIONAL SUBMITTALS

A. Source quality control reports.

B. Field quality-control reports.

1.05 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.06 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA ICS 1.

C. Comply with NFPA 110.

D. Comply with UL 1008 unless requirements of these Specifications are stricter.

E. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.

F. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

1. Short-time withstand capability for three cycles.

G. Repetitive Accuracy of Solid-State Controls: All settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

H. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

I. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.

J. Neutral Terminal: Solid and fully rated unless otherwise indicated.

K. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable with printed markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification for Electrical Systems."

1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
4. Accessible via front access.

L. Enclosures: General-purpose NEMA 250, Type 4X/12, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.02 CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES

A. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
1. Switch Action: Double throw; mechanically held in both directions.
2. Contacts: Silver composition or silver alloy for load-current switching. Contactor-style automatic transfer-switch units, rated 600 A and higher, shall have separate arcing contacts.
3. Conductor Connectors: Suitable for use with conductor material and sizes.
4. Material: Tin-plated aluminum or hard-drawn copper, 98 percent conductivity.
5. Main and Neutral Lugs: Compression type.
6. Ground Lugs and Bus-Configured Terminators: Compression type.
7. Connectors shall be marked for conductor size and type according to UL 1008.

B. Automatic Delayed-Transition Transfer Switches: Pauses or stops in intermediate position to momentarily disconnect both sources, with transition controlled by programming in the automatic transfer-switch controller. Interlocked to prevent the load from being closed on both sources at the same time.

1. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals for alternative source. Adjustable from zero to six seconds, and factory set for one second.
2. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.
3. Fully automatic break-before-make operation with transfer when two sources have near zero phase difference.

C. Automatic Transfer-Switch Controller Features:

1. Controller operates through a period of loss of control power.
2. Undervoltage Sensing for Each Phase of Normal and Alternate Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.

3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
    a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
    b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
12. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
    a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
    b. Push-button programming control with digital display of settings.
    c. Integral battery operation of time switch when normal control power is unavailable.

2.03 SOURCE QUALITY CONTROL

A. Factory Tests: Test and inspect components, assembled switches, and associated equipment according to UL 1008. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

B. Prepare test and inspection reports.

1. For each of the tests required by UL 1008, performed on representative devices, for emergency systems. Include results of test for the following conditions:
    a. Overvoltage.
    b. Undervoltage.
    c. Loss of supply voltage.
    d. Reduction of supply voltage.
    e. Alternative supply voltage or frequency is at minimum acceptable values.
    f. Temperature rise.
    g. Dielectric voltage-withstand; before and after short-circuit test.
    h. Overload.
    i. Contact opening.

j. Endurance.
k. Short circuit.
l. Short-time current capability.
m. Receptacle withstand capability.
n. Insulating base and supports damage.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Annunciator and Control Panel Mounting: Surface on wall unless otherwise indicated.

B. Identify components according to Section 260553 "Identification for Electrical Systems."

C. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

D. Comply with NECA 1.

3.02 CONNECTIONS

A. Wiring Method: Install cables in raceways except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.

1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

C. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

D. Route and brace conductors according to manufacturer's written instructions. Do not obscure manufacturer's markings and labels.

E. Final connections to equipment shall be made with liquidtight, flexible metallic conduit no more than 18 inches (457 mm) in length.

3.03 FIELD QUALITY CONTROL

A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Visual and Mechanical Inspection:

a. Compare equipment nameplate data with Drawings and Specifications.
b. Inspect physical and mechanical condition.
c. Inspect anchorage, alignment, grounding, and required clearances.
d. Verify that the unit is clean.
e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
f. Verify that manual transfer warnings are attached and visible.
g. Verify tightness of all control connections.
h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:

1) Use of low-resistance ohmmeter.
2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.

i. Perform manual transfer operation.
j. Verify positive mechanical interlocking between normal and alternate sources.
k. Perform visual and mechanical inspection of surge arresters.
l. Inspect control power transformers.

1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.
3) Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.

2. Electrical Tests:

a. Perform insulation-resistance tests on all control wiring with respect to ground.
b. Verify settings and operation of control devices.
c. Calibrate and set all relays and timers.
d. Verify phase rotation, phasing, and synchronized operation.
e. Perform automatic transfer tests.
f. Verify correct operation and timing of the following functions:

1) Normal source voltage-sensing and frequency-sensing relays.
2) Engine start sequence.
3) Time delay on transfer.
4) Alternative source voltage-sensing and frequency-sensing relays.
5) Automatic transfer operation.
6) Interlocks and limit switch function.
7) Time delay and retransfer on normal power restoration.
8) Engine cool-down and shutdown feature.

3. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

a. Check for electrical continuity of circuits and for short circuits.
b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
c. Verify that manual transfer warnings are properly placed.
d. Perform manual transfer operation.

4. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.

a. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.
b. Simulate loss of phase-to-ground voltage for each phase of normal source.
c. Verify time-delay settings.
d. Verify pickup and dropout voltages by data readout or inspection of control settings.
e. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

B. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

C. Transfer switches will be considered defective if they do not pass tests and inspections.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

3.04 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.

B. Training shall include testing ground-fault protective devices and instructions to determine when the ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.

C. Coordinate this training with that for generator equipment.

END OF SECTION

SECTION 26 5000
LIGHT FIXTURES

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the furnishing, installation, and connection of interior and exterior lighting fixtures.

B. Manufacturers and catalog numbers as specified in the Light Fixture Schedule on the drawings indicate the type and quality of fixtures to be provided. Other manufacturers may be supplied if written approval is granted by the Architect/Engineer.

C. Fixture locations as shown on the electrical drawings are accurate for bidding purposes only. Exact locations are shown on the architectural reflected ceiling plans. Coordinate locations with General Contractor and Architect.

1.02 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For nonstandard or custom luminaires.
1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

1.03 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.04 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

B. Provide luminaires from a single manufacturer for each luminaire type.

C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.05 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

B. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Ambient Temperature: 41 to 104 deg F (5 to 40 deg C).
1. Relative Humidity: Zero to 95 percent.

B. Altitude: Sea level to 1000 feet (300 m).

2.02 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
   1. Label shall include the following lamp characteristics:
      a. "USE ONLY" and include specific lamp type.
      b. Lamp diameter, shape, size, wattage, and coating.
      c. CCT and CRI.

C. Recessed luminaires shall comply with NEMA LE 4.

D. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.

E. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.

2.03 MANUFACTURERS

A. Refer to the Light Fixture Schedule on the drawings.

2.04 GENERAL FEATURES

A. Fixture housings shall be constructed of metal with thickness to meet or exceed the specified fixture and shall be rigid and resist deflection, twisting, and warping under normal installation, loading, relamping, etc.

B. Finished product shall have smooth corners and edges. Exposed screws shall be countersunk flush.

C. Fixtures with adjustable features shall provide a reliable locking device to secure adjustment in place after installation.

D. Light fixture finishes shall be applied using methods that ensure a durable, wear resistant surface. Ferrous metal surfaces shall have a protective finish to prevent rust.

E. Light fixtures shall be equipped with thermal protectors to prevent operation of lighting fixtures in temperatures that exceed 90-deg C (194 deg-F) as required by the NEC or local code.

F. Factory wiring, whether internal to the fixture or field installed, shall comply with all applicable standards including the requirements of the NEC and UL.

G. Light fixtures shall be listed and labeled and bear the label.

H. Fixtures shall be painted only after forming and assembly.

I. Lamp:
   1. Lumens: As indicated on Luminaire Schedule.
   2. Minimum allowable efficacy of 80 lm/W.
   3. CRI and CCT: As specified on drawings.
   4. Rated lamp life of 50,000 hours to L70.
   5. Dimming: Where specified, dimmable from 100 percent to 10 percent of maximum light output.
   6. Internal driver.

J. 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.

K. Standards:
   1. ENERGY STAR certified.
   2. RoHS compliant.
   3. UL Listing: Listed for damp location.
   4. Recessed luminaires shall comply with NEMA LE 4.

2.05 MATERIALS

A. Metal Parts:
   1. Free of burrs and sharp corners and edges.
   2. Sheet metal components shall be steel unless otherwise indicated.
   3. Form and support to prevent warping and sagging.

B. Steel:
   1. ASTM A36/A36M for carbon structural steel.
   2. ASTM A568/A568M for sheet steel.

C. Stainless Steel:
   1. 1. Manufacturer's standard grade.
   2. 2. Manufacturer's standard type, ASTM A240/240M.

D. Galvanized Steel: ASTM A653/A653M.

E. Aluminum: ASTM B209.

2.06 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.07 LUMINAIRE SUPPORT

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

C. Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).

D. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

2.08 EMERGENCY LIGHTING UNITS

A. Self-powered exit signs shall be equipped with an integral automatic charger in a self-contained power pack. The battery shall be a sealed, maintenance-free, nickel-cadmium type with a fully automatic, solid-state type charger with sealed transfer relay.
   1. Battery unit shall provide 90-minute operation and comply with UL 924.
   2. Exit signs shall be complete with mounting hardware, directional Chevrons, mirrored backing, and/or graphics as required for the installation.
   3. Exit lights shall self-testing/self-diagnostics.

B. Battery-packs shall be self-contained units that provide 90-minute operation and comply with UL 924. The battery shall be a sealed, maintenance-free, lead-acid type with minimum 10-year nominal life. The charger shall be fully automatic, solid-state type with sealed transfer relay.
   1. Emergency battery units shall have self-diagnostics.

C. Operation: Relay automatically energizes lamp from unit when circuit voltage drops to 80 percent of nominal or below. When normal voltage is restored, relay disconnects lamps, and battery is automatically recharged and floated on charger.

D. Remote heads for emergency lighting: Provide wiring for remote heads that clearly identify their use. Do not use wiring of the same color as supply conductors.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps in each luminaire.

D. Supports:
1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Provide support for luminaire without causing deflection of ceiling or wall.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

E. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.02 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.03 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:
1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

3.04 STARTUP SERVICE

A. Comply with requirements for startup specified in Section 26 0943 Lighting Controls.

END OF SECTION

DIVISION 27



COMMUNICATIONS

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SECTION 27 1100
TELECOMMUNICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. General requirements for telecommunications systems.

B. The Contractor shall be responsible for, but not limited to, the following:
   1. Coordinate equipment layout and wiring with telecommunications utility company.
   2. Pathways for low-voltage telecommunications cabling.
   3. Backbone cabling.
   4. All horizontal station cabling.
   5. TV cabling.
   6. Faceplates and jacks.
   7. Cable terminations at the faceplate and terminating block in the Communications Room.
   8. Patch panels.
   9. Equipment racks.
   10. Provide dedicated telephone cabling to Fire Alarm System Control Panel. Coordinate requirements with fire alarm system supplier.
   11. Cable terminations.
   12. Testing.

C. The following will be provided by the Owner:
   1. Network switches.
   2. Wireless access points.
   3. Telephones and handsets.

D. Coordinate requirements with Owner's IT department.

E. Bidding Information:
   1. Bidders shall submit information about their firm to include years of experience and project references.

1.02 QUALITY ASSURANCE

A. All materials and components shall be new, of current manufacture, and shall not have been in prior service except as required for factory testing.

B. The work as specified herein shall be completed in a manner that complies with industry standards and practices and meets all required codes and local jurisdiction requirements.

C. Installation and materials shall comply with the following standards:
   1. TIA/EIA-568-C.1, Commercial Building Telecommunications Cabling Standard.
   2. TIA/EIA-569-A, Commercial Building Standard for Telecom Pathways and Spaces.
   3. ANSI/TIA-942.
   4. BICSI.
   5. IEEE 802.
   6. J-STD-607-A-2002, Bonding Requirements for Telecommunications.
   7. IEEE 1100, Practice for Powering and Grounding Electronic Equipment.
   8. NFPA 70, National Electrical Code.
   9. IEC.
   10. UL.

D. Installer shall be a firm that specializes in performing the work as specified in this section with a minimum of five years' experience in the installation of all listed systems on site. This firm shall maintain a person on site at all times communications related work is being installed.

E. Warranty period: One year from date of substantial completion. The Contractor shall warrant that all materials and equipment furnished under the contract are in good working order, free from defects, and in conformance with the system specifications for a period of one year. All installed equipment must conform to the manufacturer's official published specifications. The contractor shall agree to repair, adjust, and/or replace (as determined by the Owner) any defective equipment, materials, and other parts of the system at the Contractor's cost. The Owner will incur no costs for replacement parts during the warranty period.

1.03 SHOP DRAWINGS/SUBMITTALS

A. Provide information in accordance with Section 260500.

B. Operation and Maintenance Manuals: Provide in accordance with Section 260000 and Section 017823:
1. Material information.
2. Maintenance data.
3. Test results.
4. Warranty certificate.

1.04 DEFINITIONS

A. Copper Backbone Cabling Description:
1. Copper 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.
2. 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.

B. Copper Horizontal Cabling Description:
1. That portion of the cabling system which extends from the station outlet to the nearest communications room. Horizontal cabling includes the communications outlet in the work area, the cable, the termination blocks, and the communications room cross-connects.
   a. TIA-568-C.1 requires that a minimum of two equipment outlets be installed for each work area.
   b. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications equipment outlet.
   c. Bridged taps and splices shall not be installed in the horizontal cabling.
2. The maximum allowable horizontal cable length is 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment or in the horizontal cross-connect.

1.05 GENERAL REQUIREMENTS

A. Infrastructure: Provide and install complete systems for telephone/data and TV.
1. Coordinate with appropriate utility company and/or service providers for incoming services to building.
2. Provide plywood backboard, cable tray, cable runway, equipment racks, and terminating equipment in Main IT room as shown on the drawings and as required.
3. Provide raceways (Division 26 Electrical Contractor) to facilitate cabling.
4. Provide the patch cables from Contractor installed patch panels to switches.
5. Telephone/Data system shall be rated for 1G bandwidth.
6. Test all installed and terminated cable.
7. Provide identification and labeling.
8. Install Owner provided switches and equipment (i.e. wireless access points).

B. Provide complete installation of cabling for telephone/data and TV to locations as shown on the drawings.
   1. Refer to drawings for locations and details.
   2. All cabling for telephone/data and TV systems shall be individually homerunned to an IT Room.
   3. Cabling for wireless access points shall be provided and installed by this Contractor. This Contractor shall install Owner furnished access point equipment.

PART 2 - PRODUCTS

2.01 PATCH PANELS

A. Copper Patch Panels: Modular panels housing numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.
   1. 48-port, Category 6 with 48 RJ45, 8-position, 8-wire ports.
   2. Universal T568A and T568B wiring labels.
   3. Capacity: 125% of the total horizontal copper cables for each IT Room.
   4. Rear cable support management.
   5. Construction: 16-gauge steel and mountable on 19-inch (483 mm) equipment racks.

B. Fiber Optic Patch Panel:
   1. Verify connector type with Owner for equipment connections.
   2. Rack mountable with cable management.
   3. Capacity: 125% of the total fiber cables.

C. Fiber Optic Splice Cabinets:
   1. Rack mountable.
   2. As required for compatibility with fiber and connectors.

2.02 EQUIPMENT RACKS

A. 2-Post rack is existing. Relocate as shown on the drawings. All new equipment shall be installed in existing rack.
   1. Coordinate with paging equipment.

B. Uninterruptible Power Source (UPS): Provide for each rack or as required for equipment backup.
   1. Input: 120-volt, NEMA 5-20R receptacle.
   2. Output: 2200VA/1920W.
   3. Load Power Outlets:
      a. Six NEMA 5-15R.
      b. Two NEMA 5-20R.
   4. Rack Units: 2 RU.
   5. Interface:
      a. USB.
      b. SmartSlot.
   6. Manufacturer: APC or pre-approved equivalent.

2.03 STATION OUTLETS

A. Boxes: Boxes for outlets shall be 4-inch by 4-inch by 2-1/2-inch deep.
   1. Refer to details on drawings for rough-in and raceway requirements. Provide raceway to an accessible ceiling space.
   2. Refer to Specification 260533, “Raceways and Boxes for Electrical Systems.”

B. Jacks and Jack Assemblies:
   1. Category 6: Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair 100-ohm unshielded or shielded twisted pair cable.
   2. Designed to snap-in to a patch panel or faceplate.
   3. Standard: Comply with TIA-568-C.2.

C. Faceplates: Provide faceplates with quantity of ports to support the cables for the station outlet. Refer to details on the drawings.
   1. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices."
   2. For use with snap-in jacks accommodating any combination of twisted pair, optical-fiber, and coaxial work-area cords.

D. Manufacturers:
   1. Panduit.
   2. Leviton.
   3. Systimax.

2.04 COPPER CABLE – CATEGORY 6

A. General Performance: Backbone cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: 25 or less.
   2. Smoke-Developed Index: 50 or less.

C. RoHS compliant.

D. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70.

E. Backbone Cable: 100-ohm, 23 AWG, four unshielded twisted pairs (UTP) riser-rated cable, with internal spline, covered with a yellow thermoplastic jacket.
   1. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.
   2. Communications, Riser Rated: Type CMR complying with UL 1666.

F. Horizontal Cable: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250MHz.
   1. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.
   2. Conductors: 100-ohm, 23 AWG solid copper.
   3. Shielding/Screening: Unshielded twisted pairs (UTP).
   4. Jacket: Yellow thermoplastic.

G. Patch Cables: Factory-made, four-pair cables in 48-inch (1200-mm) lengths; terminated with an 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. Quantity: One for each terminated cable plus 25% spare.

H. Source Quality Control:
   1. Factory test cables on reels according to TIA-568-C.1.
   2. Factory test cables according to TIA-568-C.2.
   3. Cable will be considered defective if it does not pass tests and inspections.

I. Manufacturers:
   1. Berk-Tek.
   2. General.
   3. Mohawk.
   4. CommScope.
   5. Superior Essex.
   6. Pre-approved equivalent.

2.05 FIBER OPTIC CABLE

A. Riser Cable: 50/125 micron, 850 nm laser optimized multi-mode (OM4) with a minimum bandwidth of 2000 and 500 MHz km at 850 and 1300 nm respectively. Fiber cables shall have armored jacket and be OFNP rated.

B. Connectors: LC.

C. Duplex type 568LC type able to sustain 500 mating cycles with no loss of signal quality.

D. The maximum optical attenuation each mated connector shall have is 0.5 dB. The maximum attenuation for a cross-connect from one terminated fiber to another shall not exceed 1.0 dB.

E. Splices shall be done by fusion splicing. The maximum attenuation for a fusion splice shall not exceed 0.25 dB.

F. Manufacturers:
   1. Corning.
   2. CommScope.
   3. General Cable.
   4. Pre-approved equivalent.

2.06 CABLE SUPPORT

A. For use where cable is not installed in cable tray or conduit pathways and above accessible ceilings (Do not used in exposed areas).
   1. Flexible, non-metallic loop style supports.
   2. UL Listed for use in environmental air spaces.
   3. Provide size as required for the cable capacity.
   4. Arlington or equivalent.

B. J-Hook: Caddy or equivalent.

C. Ladder Rack: Chatsworth or equivalent.

PART 3 - EXECUTION

3.01 ENTRANCE FACILITIES

A. Contact telecommunications service provider and arrange for installation of demarcation point, protected entrance terminals, and a housing when so directed by service provider.

B. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for materials and installation requirements for underground pathways.

3.02 TELECOMMUNICATIONS INSTALLATION

A. Comply with NECA 1.

B. Comply with BICSI's "Telecommunications Distribution Methods Manual" for layout of communications equipment spaces.

C. Comply with BICSI's "Information Technology Systems Installation Methods Manual" for installation of equipment in communications equipment spaces.

D. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

E. Where conduits are installed to facilitate communications cabling, they shall be placed in the straightest run possible with no more than the equivalent of two 90-degree bends per run. The maximum length between pullboxes shall be 100-feet.
   1. The conduit bending radius for conduit smaller than 2-inches shall be at least six times the internal diameter of the conduit.
   2. Conduits 2-inches and larger shall have a minimum bending radius of 10 times the internal diameter of the conduit.

3. Labeling: Clearly label conduit runs on both ends. In the Communications Rooms and Rack locations, the conduit shall be labeled with the destination room/point of the conduit.

F. Cable installed above accessible ceilings shall be installed in cable trays or supported so cables do not lay on ceiling tiles. Provide J-hook style supports. Cable shall be supported every 3-feet where not installed in cable tray or conduit and be installed a minimum of 8-inches above ceilings and not more than 24-inches above ceiling. Coordinate with other trades to avoid conflicts.

G. Cable in areas with exposed structure shall be in conduit or cable trays. Exposed free-air cable is not permitted.

H. Install cabling in a manner to avoid electro-magnetic interference from other equipment.
1. Comply with recommendations from BICSI's "Telecommunications Distribution Methods Manual" and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between communications cables in grounded metallic raceways, 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.
   c. Electrical equipment rating more than 5 kVA: A minimum of 6-inches.
   d. Separation between communications cables and electrical motors and transformers 5 kVA or HP and larger: A minimum of 48-inches.

I. Terminate all wiring and outlets in boxes. Install boxes and raceways in accordance with applicable sections of Division 26 specifications. Telecommunications boxes shall be used solely for low-voltage wiring for telecommunications.

J. Terminate all 4 pairs of each cable using T568B pin assignments as defined in ANSI/TIA/EIA-568-B.1, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements.

K. Traditional style nylon synch style tie wraps are prohibited for bundling cables. Only Velcro style tie wraps are acceptable. Do not pull tie-wraps tight as to stress the cable. Always ensure the cable is not pinched in any way.

L. Install cables parallel or perpendicular to building lines. Bundle, train, and support cables in a neat manner in accordance with industry standard practices.
1. Copper Cat 6 cable length shall not exceed 295-feet (90 meters).

M. Install equipment rack(s) in IT Room. Securely anchor floor standing racks to the floor using appropriate anchors. Securely anchor wall racks to the wall. Provide blocking and/or backboard as required.

3.03 FIRESTOPPING

A. Comply with requirements in Section 078413 "Penetration Firestopping."

B. Comply with TIA-569-D, Annex A, "Firestopping."

C. Comply with BICSI's "Information Technology Systems Installation Methods Manual", "Firestopping Practices.".

3.04 GROUNDING

A. Install grounding points in each telecommunication room. Provide a #4 AWG copper ground conductor minimum to properly ground the ground buss. Properly ground communications equipment in accordance with the NEC. Grounding installation shall comply with IEEE C2, ANSI/EAI/TIA and BICSI grounding requirements.

B. Make ground connections in such a way to minimize inductance by using minimum length paths and smoothly swept curves. Right-angle bends are prohibited.

C. All metallic racks, cable ladders, cable-shields, conduits, etc. shall be bonded to the ground bus bar. Minimum wire size for this bonding shall be #6 AWG copper.

3.05 IDENTIFICATION

A. Identify all station outlets as directed by Owner.
   1. Horizontal cabling shall be labeled in the communications room with room number and outlet number from at the station end. At the station end, the cable shall be labeled with the circuit number that the cable has been assigned.

B. All riser cables shall be labeled with floor number, a colon, and the cable pairs.

C. Backbone cables shall be labeled as cable number and count.

D. Identification Requirements:
   1. All labels shall be machine printed, handwritten labels are not acceptable. Cable wrap labels are required at both ends of all horizontal and backbone cables.
   2. Labels shall have a white background with black text.
   3. At faceplates, labels shall fit into labeling slot or be self-adhesive type. Labels shall not cover manufacturer part numbers.
   4. Plastic crimped tape adhesive labels are not acceptable.

3.06 TESTING AND COMMISSIONING

A. An inspection of the entire installation shall be made prior to conducting performance and operational tests on cable. The inspection of the cable shall be of the character and extend as to disclose an unsatisfactory condition, noncompliance in quality and/or code with installation specifications, or any other adverse conditions resulting from failure to meet standards or requirements in this specification. Contractor shall perform tests.
   1. Visually inspect 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-568-C.1.
   2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.

B. Each pair in each cable must be tested for opens, shorts, and crosses. Each cable that is not 100% quality must be replaced and retested.

C. All Category 6 locations shall be tested and certified to meet Category 6 standards using industry standard test equipment. All tests shall be completed with the same manufacturer of tester.
   1. Test instruments shall meet or exceed applicable requirements in TIA-568-C.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.

D. The Owner reserves the right to randomly test any cabling. If problems are discovered, the installer shall make corrections required until the problem is corrected.

E. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similarly to Table 10.1 in BICSI's "Telecommunications Distribution Methods Manual," or shall be transferred from the instrument to the computer, saved as text files, printed, and submitted.

   1. Reports shall be submitted in hardcopy form for the Operations and Maintenance manual, one copy per manual, and in electronic form for the Owner.
   2. A copy of the report shall be submitted to the Owner’s infrastructure engineer.

F. Furnish complete as-built drawings that indicate all equipment locations, station outlets, and labeling for station outlets and cable.

END OF SECTION

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SECTION 27 5116
PAGING SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes a new paging system for the fire station. Provide all components required to include, but not be limited to, the following:

1. Digital Signal Processor.
2. Amplifiers.
3. System Controller.
4. Telephone paging adapter.
5. Speakers.
6. Paging Station.
7. Conductors and cables.

B. Contractor providing and installing this system shall be sub-Contractor to the Division 26 Electrical Contractor.

C. Cat 6A cable shall be installed by the Division 27 Structured Cabling Contractor. All other cable required for this system shall be installed by this Contractor.

1.02 REFERENCES

A. Giddings, Audio System Design and Installation, Howard W. Sams, 1990.

B. Handbook for Sound Engineers, 3rd Ed., Glen Ballou, editor, Howard W. Sams.

C. Audiovisual Best Practices, Infocomm 2005.

1.03 STANDARDS

A. All work and tests conducted as part of this project shall be performed in accordance with current industry standards, including the following:

1. NEC (National Electrical Code).
2. UL (Underwriters Laboratories).
3. NFPA (National Fire Protection Association).
4. OSHA (Occupational Safety and Health Administration).
5. NEMA (National Electrical Manufacturer's Association).
6. NECA (National Electrical Contractors Association).
7. ANSI (American National Standards Institute).
8. ASTM (American Society of Testing and Materials).
9. IEEE (Institute of Electrical and Electronic Engineers).
10. EIA (Electronics Industries Association).
11. AES (Audio Engineering Society).
12. ASA (Acoustical Society of America).
13. ISO (International Standards Organization).

1.04 CONTRACTOR QUALIFICATION REQUIREMENTS

A. The A/V contractor shall demonstrate experience in the provision and installation of systems similar in complexity to this project and shall meet the following requirements:

1. The primary business of the installing contractor shall be the installation of sound and video systems. The installing contractor shall have a physical business location within 100 miles of the project location and be able to provide remote support within three hours and on-site emergency service within eight hours.

2. The A/V contractor shall demonstrate no less than 5 years of experience installing the types of systems and equipment specified for this project.
3. The installing contractor shall be a factory authorized, franchised dealer for all of the products that are to be furnished and installed on this project.
4. The installing contractor shall maintain a fully staffed and equipped service organization capable of furnishing adequate inspection, testing and service for the A/V systems and system components, including assurance of availability of replacement parts for the length of the warranty period. Full-time field technicians shall be available during normal 8 AM to 5 PM business hours.
5. The installing contractor shall assign, for the duration of the project, an employee to act as the person responsible for all technical aspects of the project at the contractor level.

1.05 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Power, signal, and control wiring.

1.06 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.07 WARRANTY

A. Submit one-year material and labor warranty dated to begin with Acceptance of the Work in this Section.

PART 2 - PRODUCTS

2.01 FUNCTIONAL DESCRIPTION OF SYSTEM

A. System Functions:

1. A 5” Touch-panel controller will be the interface to manage system functions.
2. The PA system will have separate zones for sleeping rooms, common areas, and the truck bays.
3. Sleeping rooms will incorporate sound masking and a provision to automatically mute masking and play prerecorded tones or voice messages with sequentially increasing loudness.
4. A wall mounted Bluetooth receiver will provide connectivity for personal devices.
5. A push-to-talk desk microphone will support voice paging.
6. A telephone interface will allow DTMF tones to remotely initiate the automatic playback of prerecorded tones or voice messages.

2.02 SIGNAL SOURCE, PROCESSING, AND CONTROL EQUIPMENT

A. Digital Signal Processor (DSP)

1. Plan Designation: DPS-1.
2. Configuration: 4 x 4 I/O
3. Product: QSC Core 8 Flex with Dante
4. Substitution by approved means.

B. Amplifiers:

1. Plan Designation: PA-1.
2. Configuration: 4 x 150 W Class D with Dante.
3. Rack mount ½ U wide.
4. Product: Powersoft model # Mezzo 604 AD.
5. Substitution by approved means.

C. 5” Touch-Panel Desktop Controller:

1. Plan Designation: TP-1.

2. Product: QSC model # TSC-50-G3.
3. Substitution by approved means.

D. Bluetooth Receiver:

1. Plan Designation: BTR-1
2. Configuration: Bluetooth to Dante conversion.
3. Product: RDL model # BTN21 (black).
4. Substitution by approved means.

E. Wired Mic Jack Panel:

1. Plan Designation: MIC-1.
2. Product: RDL model # RDL XLR3F.
3. Substitution by approved means.

F. Desktop Microphone:

1. Quantity: (1) one.
2. Configuration: 12” Cardioid Gooseneck.
3. Product: Audix model #ADX12 with #ATS-1 base.
4. Substitution by approved means.

G. Network Switch:

1. Plan Designation: NS-1.
2. Configuration: 8-port, PoE, Gigahertz, managed switch.
3. Product: Netgear model # GS308EP.
4. Substitution by approved means.

2.03 LOUDSPEAKERS

A. Distributed-mode Sound Masking Speaker (Sleeping Rooms).
1. Configuration: 2’x 2 distributed mode ACT panel loudspeaker.
2. Coverage Pattern: 130-deg conical.
3. Product: Revolution Audio model # Ubiqui-T360 mounting plate.
4. Product: Revolution Audio model # SSP6 Multiducer.
5. Substitution by approved means.

B. Ceiling Speaker – Ceiling Mount
1. Configuration: 6.5-inch coaxial 2-way with 25/70V transformer.
2. Coverage Pattern: 115-deg conical.
3. Product: Biamp Desono model # DP6-B.
4. Substitution by approved means.

2.04 **REMOTE TELEPHONE ACCESS EQUIPMENT**

A. Telephone Answering Adapter:
1. Plan Designation: TAA-1
2. Product: Viking Electronics model # RC-2A.
3. Substitution by approved means.

2.05 WIRE & CABLE

A. West Penn Wire Products have been listed as an example.

1. Approved equivalent manufacturers: Belden, Gepco, Liberty.

B. Analog Microphone and Signal Cable:

1. Configuration: NEC Type CMR – 24 AWG stranded twisted shielded pair.

2. Product: West Penn Model No. 291.
3. Plenum Product: 25291B.
4. Color: Black.
5. Properties: 26-ohms / M' with OD = 0.182".

C. Loudspeaker Cable (70V Distribution) and low power (Low Z):

1. Configuration: NEC Type CMR – 18 AWG (7 x 26) stranded pair.
2. Product: West Penn Model No. 224.
3. Plenum Product: West Penn Model No. 25224B.
4. Color: Black.
5. Properties: 6.2 ohms / M' with OD = 0.155".

D. Data Cable:

1. Configuration: NEC Type CMR Category 6, 4 pair, 24 AWG.
2. Product: West Penn Model No. 4246.
3. Plenum Product: West Penn Model No. 254246.
4. Properties: 30.5 dB attenuation at 250 MHz per 100' with OD = 0.227".

PART 3 - EXECUTION

3.01 WIRING METHODS

A. Wiring Method:

1. Install cables in pathways and cable trays except within consoles, cabinets, desks, and counters, and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal pathway and cables except in unfinished spaces.

   a. Install plenum cable in environmental air spaces, including plenum ceilings.

2. Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

B. Wiring within Enclosures: Bundle, lace, and train cables to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.02 INSTALLATION OF CABLES

A. Comply with NECA 1.

B. General Cable Installation Requirements:

1. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at outlets and terminals.
2. Splices, Taps, and Terminations: Arrange on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Cables may not be spliced.
3. 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.
4. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
5. 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.
6. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used.

C. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend speaker cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceiling by cable supports not more than 60 inches (1524 mm) apart.
3. Cable shall not be run through structural members or be in contact with pipes, ducts, or other potentially damaging items.

D. Separation of Wires: Separate speaker-microphone, line-level, speaker-level, and power wiring runs. Install in separate pathways or, where exposed or in same enclosure, separate conductors at least 12 inches (300 mm) apart for speaker microphones and adjacent parallel power and telephone wiring. Separate other communication equipment conductors as recommended by equipment manufacturer.

3.03 INSTALLATION

A. Coordinate layout and installation of system components and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

B. Match input and output impedances and signal levels at signal interfaces. Provide matching networks where required.

C. Identification of Conductors and Cables: Color-code conductors and apply wire and cable marking tape to designate wires and cables so they identify media in coordination with system wiring diagrams.

D. Wall-Mounted Outlets: Flush mounted.

E. Conductor Sizing: Unless otherwise indicated, size speaker circuit conductors from racks to loudspeaker outlets not smaller than No. 18 AWG and conductors from microphone receptacles to amplifiers not smaller than No. 22 AWG.

F. Weatherproof Equipment: For units that are mounted outdoors, in damp locations, or where exposed to weather, install consistent with requirements of weatherproof rating.

G. Speaker-Line Matching Transformer Connections: Make initial connections using tap settings indicated on Drawings.

H. Approved Wire Termination Means:

1. Solder Connections: For connectors utilizing solder cups.
2. Captive Screw Terminal Strips: For termination of blunt cut cables.
3. Captive Screw Connectors: Utilize crimp-on ferrules for stranded wire.
4. Multi-Pin Connectors: Utilize connector manufacturer’s recommended crimper.
5. Crimp Cap Terminations: For loudspeaker circuits at individual devices.
6. Wire nuts are not approved termination means.

3.04 GROUNDING

A. Ground cable shields and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

3.05 PROGRAMMING

A. Provide all required programming of system DSP and touch panel controler. Coordinate final zone arrangement and functions with Owner.

3.06 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Schedule tests with at least seven days' advance notice of test performance.

2. After installing public address system and after electrical circuitry has been energized, test for compliance with requirements.
3. Ensure the following conditions:
    a. All loudspeaker feed lines have been checked for:
        1) Shorts or partial shorts between conductors.
        2) Shorts between conductors and shields.
        3) Shorts between conductors and the conduit or raceway system.
4. Operational Test: Perform tests that include originating program and page messages at microphone outlets, preamplifier program inputs, and other inputs. Verify proper routing and volume levels and that system is free of noise and distortion.

C. Loudspeaker Impedance Measurements:
1. Each loudspeaker circuit shall be measured to insure that the amplifier is not being overloaded.
2. Measurements shall be made with an impedance bridge using the following test frequencies:
    a. Full Range Systems: 1.0 kHz.
    b. High Frequency cluster components: 4.0 kHz.
    c. Mid-Frequency cluster components: 1.0 kHz.
    d. Low-Frequency cluster components: 400 Hz.
    e. Sub-Woofer Loudspeaker components: 100 Hz.
    f. 70-volt paging loudspeakers: 200 Hz and 1.0 kHz.

D. Loudspeaker Polarity Verification: Using an electronic polarity checker, TEF or similar device, apply a polarity test signal to the amplifier input, and test each associated loudspeaker for correct polarity. All loudspeakers should have the same relative polarity

E. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified. Prepare a list of final tap settings of paging speaker-line matching transformers.

F. Public address system will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.
1. Include a record of final speaker-line matching transformer-tap settings and signal ground-resistance measurement certified by Installer.

3.07 SYSTEM TRAINING

A. Provide a minimum of 2 hours to train Owner’s personnel on use of system.

B. Coordinate schedule of training with Construction Manager at least 14 days prior to training.

END OF SECTION

DIVISION 28



ELECTRONIC SAFETY & SECURITY

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SECTION 28 4621
ADDRESSABLE FIRE-ALARM SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Addressable fire-alarm system.
2. Fire-alarm control unit (FACU).
3. Manual fire-alarm boxes.
4. System smoke detectors.
5. Duct smoke detectors.
6. Carbon monoxide detectors.
7. Heat detectors.
8. Fire-alarm notification appliances.
9. Fire-alarm remote annunciators.
10. Fire-alarm addressable interface devices.
11. Digital alarm communicator transmitters (DACTs).

B. Related Requirements:
1. Section 087100 "Door Hardware" for magnetic door holders that release in response to fire-alarm outputs.
2. Section 260519 "Low-Voltage Electrical Power Conductors and Cables".

C. Fire alarm system supplier shall be responsible for ensuring installed system is code compliant and coverage and notification requirements are in accordance with NFPA 72. System supplier shall provide all components and programming necessary for a complete system whether shown on the drawings or not.

D. The fire alarm system shall be design/build. Fire alarm devices shown on the drawings are to provide coverage intent. Fire alarm supplier shall ensure that system design and installation complies with NFPA 72 and State Fire Alarm Code and all other applicable codes. Fire alarm system is provided and installed by the Electrical Contractor. System supplier and installer shall design the wiring and verify that system complies with all applicable codes.

E. Wiring indicated on drawings is for estimating purposes only. Wiring may vary by manufacturer. Installation wiring drawings shall be provided by supplier prior to installation. Cad files in AutoCad format will be provided to system supplier if needed.

F. System supplier shall review architectural and mechanical drawings and provide fire alarm devices and monitoring as required by code for fire/smoke dampers, sprinkler systems, ansul systems, and duct smoke detectors. Change orders will not be permitted after the bid for these items that are shown on the architectural and mechanical bid set drawings.

G. The Contractor or system supplier shall be responsible for submitting required documentation to the Authority Having Jurisdiction for permitting and/or plan review and approval.

1.02 DEFINITIONS

A. DACT: Digital alarm communicator transmitter.

B. FACU: Fire-alarm control unit.

C. Voltage Class: For specified circuits and equipment, voltage classes are defined as follows:
1. Control Voltage: Listed and labeled for use in remote-control, signaling, and power-limited circuits supplied by a Class 2 or Class 3 power supply having rated output not greater than 150 V and 5 A, allowing use of alternate wiring methods complying with NFPA 70, Article 725.

2. Low Voltage: Listed and labeled for use in circuits supplied by a Class 1 or other power supply having rated output not greater than 1000 V, requiring use of wiring methods complying with NFPA 70, Article 300, Part I.

1.03 ACTION SUBMITTALS

A. Approved Permit Submittal: Submittals must be approved by authorities having jurisdiction prior to submitting them to Architect.

B. Product Data: For each type of product, including furnished options and accessories.
1. Include construction details, material descriptions, dimensions, profiles, and finishes.
2. Include rated capacities, operating characteristics, and electrical characteristics.

C. Shop Drawings: For fire-alarm system.
1. Comply with recommendations and requirements in "Documentation" section of "Fundamentals" chapter in NFPA 72.
2. Include plans, elevations, sections, and details, including details of attachments to other Work.
3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
4. Detail assembly and support requirements.
5. Include voltage drop calculations for notification-appliance circuits.
6. Include battery-size calculations.
7. Include input/output matrix.
8. Include written statement from manufacturer that equipment and components have been tested as a system and comply with requirements in this Section and in NFPA 72.
9. Include performance parameters and installation details for each detector.
10. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
11. Provide control wiring diagrams for fire-alarm interface to HVAC; coordinate location of duct smoke detectors and access to them.
    a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
    b. Show field wiring and equipment required for HVAC unit shutdown on alarm.
    c. Locate detectors in accordance with manufacturer's written instructions.
12. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
    a. Comply with "Records" section of "Inspection, Testing and Maintenance" chapter in NFPA 72.
    b. Provide "Fire-Alarm and Emergency Communications System Record of Completion Documents" in accordance with "Completion Documents" Article in "Documentation" section of "Fundamentals" chapter in NFPA 72.
    c. Complete wiring diagrams showing connections between devices and equipment. Each conductor must be numbered at every junction point with indication of origination and termination points.
    d. Riser diagram.
    e. Device addresses.
    f. Air-sampling system sample port locations and modeling program report showing layout meets performance criteria.
    g. Record copy of site-specific software.

h. Provide "Inspection and Testing Form" in accordance with "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
   1) Equipment tested.
   2) Frequency of testing of installed components.
   3) Frequency of inspection of installed components.
   4) Requirements and recommendations related to results of maintenance.
   5) Manufacturer's user training manuals.
i. Manufacturer's required maintenance related to system warranty requirements.
j. Abbreviated operating instructions for mounting at FACU and each annunciator unit.

B. Software and Firmware Operational Documentation:
1. Software operating and upgrade manuals.
2. Program Software Backup: On USB media.
3. Device address list.
4. Printout of software application and graphic screens.

1.05 QUALITY ASSURANCE

A. Installer Qualifications:
1. Personnel must be trained and certified by manufacturer for installation of units required for this Project.
2. Installation must be by personnel certified by NICET as fire-alarm Level II technician.
3. Obtain certification by NRTL in accordance with NFPA 72.
4. Licensed or certified by authorities having jurisdiction.

1.06 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail because of defects in materials or workmanship within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 ADDRESSABLE FIRE-ALARM SYSTEM

A. Description:
1. Noncoded, UL-certified addressable system, with multiplexed signal transmission and horn-and-strobe notification for evacuation.

B. Performance Criteria:
1. Regulatory Requirements:
   a. Fire-Alarm Components, Devices, and Accessories: Listed and labeled by a NRTL in accordance with NFPA 70 for use with selected fire-alarm system and marked for intended location and application.
2. General Characteristics:
   a. Automatic sensitivity control of certain smoke detectors.
   b. Fire-alarm signal initiation must be by one or more of the following devices:
      1) Manual stations.
      2) Heat detectors.
      3) Smoke detectors.
      4) Duct smoke detectors.
      5) Carbon monoxide detectors.
      6) Automatic sprinkler system water flow.
      7) Fire standpipe system.
      8) Dry system pressure flow switch.
   c. Fire-alarm signal must initiate the following actions:
      1) Continuously operate alarm notification appliances..
      2) Identify alarm and specific initiating device at FACU, and remote annunciators.

3) Transmit alarm signal to remote alarm receiving station.
4) Unlock electric door locks in designated egress paths.
5) Release fire and smoke doors held open by magnetic door holders.
6) Activate notification communication system.
7) Switch HVAC equipment controls to fire-alarm mode.
8) Activate smoke-control system (smoke management) at firefighters' smoke-control system panel.
9) Activate stairwell and elevator-shaft pressurization systems.
10) Close smoke dampers in air ducts of designated air-conditioning duct systems.
11) Activate preaction system.
12) Recall elevators to primary or alternate recall floors.
13) Activate elevator power shunt trip.
14) Activate emergency lighting control.
15) Activate emergency shutoffs for gas and fuel supplies, except for shutoffs serving legally required life-safety systems such as emergency generators and fire pumps.
16) Record events in system memory.
17) Record events by system printer.
18) Indicate device in alarm on graphic annunciator.
19) Interface with Audio Systems to disable those systems in the event of an alarm.

d. Supervisory signal initiation must be by one or more of the following devices and actions:
1) Valve supervisory switch.
2) Elevator shunt-trip supervision.
3) Independent fire-detection and -suppression systems.
4) Zones or individual devices have been disabled.
5) FACU has lost communication with network.

e. System trouble signal initiation must be by one or more of the following devices and actions:
1) Open circuits, shorts, and grounds in designated circuits.
2) Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3) Loss of communication with addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.
4) Loss of primary power at FACU.
5) Ground or single break in internal circuits of FACU.
6) Abnormal ac voltage at FACU.
7) Break in standby battery circuitry.
8) Failure of battery charging.
9) Abnormal position of switch at FACU or annunciator.

f. System Supervisory Signal Actions:
1) Initiate notification appliances.
2) Identify specific device initiating event at FACU, and remote annunciators.
3) Record event on system printer.
4) After time delay of 200 seconds, transmit trouble or supervisory signal to remote alarm receiving station.
5) Transmit system status to building management system.
6) Display system status on graphic annunciator.

g. Device Guards:
1) Description: Welded wire mesh of size and shape for manual station, smoke detector, gong, or other device requiring protection.
a) Factory fabricated and furnished by device manufacturer.
b) Finish: Paint of color to match protected device.

h. Document Storage Box:

1) Description: Enclosure to accommodate standard 8-1/2-by-11 inch (216-by-279 mm) manuals and loose document records. Legend sheet will be permanently attached to door for system required documentation, key contacts, and system information. Provide two key ring holders with location to mount standard business cards for key contact personnel.
2) Material and Finish: 18-gauge cold-rolled steel; four mounting holes.
3) Color: Red powder-coat epoxy finish.
4) Labeling: Permanently screened with 1 inch (25 mm) high lettering "SYSTEM RECORD DOCUMENTS" with white indelible ink.
5) Security: Locked with 3/4 inch (19 mm) barrel lock. Provide solid 12 inch (304 mm) stainless steel piano hinge.

2.02 APPROVED SYSTEM MANUFACTURERS

A. Subject to compliance with these specifications, the following manufacturers are approved.
1. JCI - Simplex 4100ES voice evacuation system.
2. Gamewell-FCI.
3. Potter.
4. EST.
5. Autocall.

B. Other manufacturers shall submit for prior approval prior to bidding.

2.03 FIRE-ALARM CONTROL UNIT (FACU)

A. Description: Field-programmable, microprocessor-based, modular, power-limited design with electronic modules.

B. Performance Criteria:
1. Regulatory Requirements: Comply with NFPA 72 and UL 864.
2. General Characteristics:
a. System software and programs must be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining information through failure of primary and secondary power supplies.
b. Include real-time clock for time annotation of events on event recorder and printer.
c. Provide communication between FACU and remote circuit interface panels, annunciators, and displays.
d. FACU must be listed for connection to central-station signaling system service.
e. Provide nonvolatile memory for system database, logic, and operating system and event history. System must require no manual input to initialize in the event of complete power down condition. FACU must provide minimum 500-event history log.
f. Addressable Initiation Device Circuits: FACU must indicate which communication zones have been silenced and must provide selective silencing of alarm notification appliance by building communication zone.
1) Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: FACU must be listed for releasing service.
g. Alphanumeric Display and System Controls: Arranged for interface between human operator at FACU and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and programming and control menu.
1) Annunciator and Display: LCD, two line(s) of 40 characters, minimum.
2) Keypad: Arranged to permit entry and execution of programming, display, and control commands.
h. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:
1) Pathway Class Designations: NFPA 72, Class B.
2) Pathway Survivability: Level 0.
3) Install no more than 100 addressable devices on each signaling-line circuit.

4) Install fault circuit isolators to comply with circuit performance requirements of NFPA 72 or with manufacturer's written instructions, whichever is more conservative.

i. Serial Interfaces:
   1) One dedicated RS 485 port for central-station operation using point ID DACT.
   2) One RS 485 port for remote annunciators, Ethernet module, or multi-interface module (printer port).
   3) One USB port for PC configuration.
   4) One RS 232 port for air-aspirating smoke detector connection.

j. Stairwell and Elevator Shaft Pressurization: Provide output signal using addressable relay to start stairwell and elevator shaft pressurization system. Signal must remain on until alarm conditions are cleared and fire-alarm system is reset. Signal must not stop in response to alarm acknowledge or signal silence commands.
   1) Pressurization starts when alarm is received at FACU.
   2) Alarm signals from smoke detectors at pressurization air supplies have higher priority than other alarm signals that start system.

k. Notification-Appliance Circuit:
   1) Audible appliances must sound in three-pulse temporal pattern, as defined in NFPA 72.
   2) Where notification appliances provide signals to sleeping areas, alarm signal must be 520 Hz square wave with intensity 15 dB above average ambient sound level or 5 dB above maximum sound level, or at least 75 dB(A-weighted), whichever is greater, measured at pillow.
   3) Visual alarm appliances must flash in synchronization where multiple appliances are in same field of view, as defined in NFPA 72.

l. Elevator Recall: Initiate by one of the following alarm-initiating devices:
   1) Elevator lobby detectors except lobby detector on designated floor.
   2) Smoke detectors in elevator machine room.
   3) Smoke detectors in elevator hoistway.

m. Elevator controller must be programmed to move cars to alternate recall floor if lobby detectors located on designated recall floors are activated.

n. Water-flow alarm connected to sprinkler in elevator shaft and elevator machine room must shut down elevators associated with location without time delay.
   1) Water-flow switch associated with sprinkler in elevator pit may have delay to allow elevators to move to designated floor.

o. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke-barrier walls must be connected to fire-alarm system.

p. Remote Smoke-Detector Sensitivity Adjustment: Controls must select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change 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 print out final adjusted values on system printer.

q. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to remote alarm station.

r. Primary Power: 24 V(dc) obtained from 120 V(ac) service and power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, and supervisory signals must be powered by 24 V(dc) source.

s. Alarm current draw of entire fire-alarm system must not exceed 80 percent of power-supply module rating.

t. Secondary Power: 24 V(dc) supply system with batteries, automatic battery charger, and automatic transfer switch.

u. Batteries: Sealed lead calcium.

C. Accessories:

1. Instructions: Computer printout or typewritten instruction card mounted behind plastic or glass cover in stainless steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe functional operation of system under normal, alarm, and trouble conditions.
2. Preaction System Functionality:
   a. Initiate Presignal Alarm: This function must cause audible and visual alarm and indication to be provided at FACU. Activation of initiation device connected as part of preaction system must be annunciated at FACU only, without activation of general evacuation alarm.

2.04 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes must be finished in red with molded, raised-letter operating instructions in contrasting color; must show visible indication of operation; and must be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
   1. Double-action mechanism requiring two actions to initiate alarm, breaking-glass or plastic-rod type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to FACU.
   2. Station Reset: Key- or wrench-operated switch.
   3. Able to perform at up to 90 percent relative humidity at 90 deg F (32 deg C).

2.05 SYSTEM SMOKE DETECTORS

A. Photoelectric Smoke Detectors:
   1. Performance Criteria:
      a. Regulatory Requirements:
         1) NFPA 72.
      b. General Characteristics:
         1) Detectors must be four wire type.
         2) Base Mounting: Detector and associated electronic components must be mounted in twist-lock module that connects to fixed base. Provide terminals in fixed base for connection to building wiring.
         3) Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
         4) Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.
         5) Detector address must be accessible from FACU and must be able to identify detector's location within system and its sensitivity setting.
         6) Operator at FACU, having designated access level, must be able to manually access the following for each detector:
            a) Primary status.
            b) Device type.
            c) Present average value.
            d) Present sensitivity selected.
            e) Sensor range (normal, dirty, etc.).
         7) Detector must have functional humidity range within 10 to 90 percent relative humidity.
         8) Color: White.
         9) Remote Control: Unless otherwise indicated, detectors must be digital-addressable type, individually monitored at FACU for calibration, sensitivity, and alarm condition.

2.06 DUCT SMOKE DETECTORS

A. Description: Photoelectric-type, duct-mounted smoke detector.

B. Performance Criteria:
   1. Regulatory Requirements:

a. NFPA 72.
b. UL 268A.

2. General Characteristics:
   a. Detectors must be four-wire type.
   b. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to FACU.
   c. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
   d. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.
   e. Detector address must be accessible from FACU and must be able to identify detector's location within system and its sensitivity setting.
   f. Operator at FACU, having designated access level, must be able to manually access the following for each detector:
      1) Primary status.
      2) Device type.
      3) Present average value.
      4) Present sensitivity selected.
      5) Sensor range (normal, dirty, etc.).
   g. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with supplied detector for smoke detection in HVAC system ducts.
   h. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
   i. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

2.07 CARBON MONOXIDE DETECTORS

A. Description: Carbon monoxide detector listed for connection to fire-alarm system.

B. Performance Criteria:
   1. Regulatory Requirements:
      a. NFPA 72
      b. NFPA 720.
      c. UL 2075.
   2. General Characteristics:
      a. Mounting: Adapter plate for outlet box mounting.
      b. Testable by introducing test carbon monoxide into sensing cell.
      c. Detector must provide alarm contacts and trouble contacts.
      d. Detector must send trouble alarm when nearing end-of-life, power supply problems, or internal faults.
      e. Locate, mount, and wire in accordance with manufacturer's written instructions.
      f. Provide means for addressable connection to fire-alarm system.
      g. Test button simulates alarm condition.

2.08 HEAT DETECTORS

A. Combination-Type Heat Detectors:
   1. Performance Criteria:
      a. Regulatory Requirements:
         1) NFPA 72.
         2) UL 521.
      b. General Characteristics:
         1) Temperature sensors must test for and communicate sensitivity range of device.
      c. Actuated by fixed temperature of 135 deg F (57 deg C) or rate of rise that exceeds 15 deg F (8 deg C) per minute unless otherwise indicated.
      d. Mounting: Twist-lock base interchangeable with smoke-detector bases.

e. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to FACU.
f. Detector must have functional humidity range of 10 to 90 percent relative humidity.
g. Color: White.

B. Fixed-Temperature-Type Heat Detectors:
1. Performance Criteria:
a. Regulatory Requirements:
1) NFPA 72.
2) UL 521.
b. General Characteristics:
1) Actuated by temperature that exceeds fixed temperature of 190 deg F (88 deg C).
2) Mounting: Twist-lock base interchangeable with smoke-detector bases.
3) Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to FACU.
4) Detector must have functional humidity range of 10 to 90 percent.
5) Color: White.

2.09 FIRE ALARM NOTIFICATION APPLIANCES

A. General: Notification appliances shall include on their nameplates reference to electrical requirements and rated audible or visible performance, or both, as defined by the listing authority in accordance to NFPA 72 18.3.2.
1. Audible and visible intensity settings will be verified during the final safety/health inspection.

B. Fire-Alarm Voice/Tone Notification Appliances:
1. Description: Notification appliances capable of outputting voice evacuation messages.
2. Performance Criteria:
a. Regulatory Requirements:
1) NFPA 72.
2) UL 1480.
3. General Characteristics:
a. Speakers for Voice Notification: Locate speakers for voice notification to provide intelligibility requirements of "Notification Appliances" and "Emergency Communications Systems" chapters in NFPA 72.
1) High-Range Units: Rated 2 to 15 W.
2) Low-Range Units: Rated 1 to 2 W.
b. Mounting: Flush or semi-recessed.
c. Matching Transformers: Tap range matched to acoustical environment of speaker location.
4. Combination Devices: Factory-integrated audible and visible devices in single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.

C. Fire-Alarm Visible Notification Appliances:
1. Performance Criteria:
a. Regulatory Requirements:
1) NFPA 72.
2) UL 1971.
b. General Characteristics:
1) Rated Light Output:
a) 15/30/75/110 cd, selectable in field.
2) Clear or nominal white polycarbonate lens mounted on aluminum faceplate.
3) Mounting: Wall mounted unless otherwise indicated.
4) For units with guards to prevent physical damage, light output ratings must be determined with guards in place.
5) Flashing must be in temporal pattern, synchronized with other units.

6) Strobe Leads: Factory connected to screw terminals.
7) Mounting Faceplate: Factory finished, white.

2.10 FIRE-ALARM REMOTE ANNUNCIATORS

A. Performance Criteria:
1. Regulatory Requirements:
a. NFPA 72.
2. General Characteristics:
a. Annunciator functions must match those of FACU for alarm, supervisory, and trouble indications. Manual switching functions must match those of FACU, including acknowledging, silencing, resetting, and testing.
1) Mounting: Flush cabinet, NEMA 250, Type 1.
b. Display Type and Functional Performance: Alphanumeric display and LED indicating lights must match those of FACU. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.11 FIRE-ALARM ADDRESSABLE INTERFACE DEVICES

A. Performance Criteria:
1. Regulatory Requirements:
a. NFPA 72.
2. General Characteristics:
a. Include address-setting means on module.
b. Store internal identifying code for control panel use to identify module type.
c. Listed for controlling HVAC fan motor controllers.
d. Monitor Module: Microelectronic module providing system address for alarm-initiating devices for wired applications with normally open contacts.
e. Integral Relay: Capable of providing direct signal to elevator controller to initiate elevator recall.
1) Allow control panel to switch relay contacts on command.
2) Have minimum of two normally open and two normally closed contacts available for field wiring.
f. Control Module:
1) Operate notification devices.
2) Operate solenoids for use in sprinkler service.

2.12 DIGITAL ALARM COMMUNICATOR TRANSMITTERS (DACTs)

A. Performance Criteria:
1. Regulatory Requirements:
a. NFPA 72.
2. General Characteristics:
a. DACT must be acceptable to remote central station and must be listed for fire-alarm use.
b. Functional Performance: Unit must receive alarm, supervisory, or trouble signal from FACU and automatically capture one telephone line(s) and dial preset number for remote central station. When contact is made with central station(s), signals must be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter must initiate local trouble signal and transmit signal indicating loss of telephone line to remote alarm receiving station over remaining line. Transmitter must automatically report telephone service restoration to central station. If service is lost on both telephone lines, transmitter must initiate local trouble signal.
c. Local functions and display at DACT must include the following:
1) Verification that both telephone lines are available.
2) Programming device.
3) LED display.
4) Manual test report function and manual transmission clear indication.
5) Communications failure with central station or FACU.

d. Digital data transmission must include the following:
   1) Address of alarm-initiating device.
   2) Address of supervisory signal.
   3) Address of trouble-initiating device.
   4) Loss of ac supply.
   5) Loss of power.
   6) Low battery.
   7) Abnormal test signal.
   8) Communication bus failure.

e. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.
   1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.

B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protection of In-Place Conditions: Protect devices during construction unless devices are placed in service to protect facility during construction.

3.03 INSTALLATION OF EQUIPMENT

A. Comply with NECA 305, NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
   1. Devices placed in service before other trades have completed cleanup must be replaced.
   2. Devices installed, but not yet placed, in service must be protected from construction dust, debris, dirt, moisture, and damage in accordance with manufacturer's written storage instructions.

B. Install wall-mounted equipment, with tops of cabinets not more than 78 inch (1980 mm) above finished floor.

C. Manual Fire-Alarm Boxes:
   1. Install manual fire-alarm box in normal path of egress within 60 inch (1520 mm) of exit doorway.
   2. Mount manual fire-alarm box on background of contrasting color.
   3. Operable part of manual fire-alarm box must be between 42 and 48 inch (1060 and 1220 mm) above floor level. Devices must be mounted at same height unless otherwise indicated.

D. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend full width of duct. Tubes more than 36 inch (9100 mm) long must be supported at both ends.
   1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.

E. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.

F. Remote Status and Alarm Indicators: Install in visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.

G. Audible Alarm-Indicating Devices: Install not less than 6 inch (150 mm) below ceiling. Install bells and horns on flush-mounted back boxes with device-operating mechanism concealed behind grille. Install devices at same height unless otherwise indicated.

H. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inch (150 mm) below ceiling. Install devices at same height unless otherwise indicated.

I. Device Location-Indicating Lights: Locate in public space near device they monitor.

3.04 ELECTRICAL CONNECTIONS

A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.

D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
   1. Nameplate must be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."

3.05 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring in accordance with manufacturer’s requirements.

C. Install nameplate for each control connection, indicating field control panel designation and I/O control designation feeding connection.

3.06 PATHWAYS

A. Pathways above recessed ceilings and in inaccessible locations may be routed exposed.
   1. Exposed pathways must be installed in EMT.

B. Exposed EMT must be painted red enamel.

3.07 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 087100 "Door Hardware." Connect hardware and devices to fire-alarm system.
   1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.

B. Make addressable connections with supervised interface device to the following devices and systems. Install interface device less than 36 inch (910 mm) from device controlled. Make addressable confirmation connection when such feedback is available at device or system being controlled.
   1. Alarm-initiating connection to smoke-control system (smoke management) at firefighters' smoke-control system panel.
   2. Alarm-initiating connection to stairwell and elevator-shaft pressurization systems.
   3. Smoke dampers in air ducts of designated HVAC duct systems.
   4. Magnetically held-open doors.

5. Electronically locked doors and access gates.
6. Alarm-initiating connection to elevator recall system and components.
7. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
8. Supervisory connections at valve supervisory switches.
9. Supervisory connections at elevator shunt-trip breaker.

3.08 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 270553 "Identification for Communications Systems."

B. Install framed instructions in location visible from FACU.

3.09 GROUNDING

A. Ground FACU and associated circuits in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."

B. Ground shielded cables at control panel location only. Insulate shield at device location.

3.10 FIELD QUALITY CONTROL

A. Field tests must be witnessed by authorities having jurisdiction.

B. Administrant for Tests and Inspections:
1. Engage qualified testing agency to administer and perform tests and inspections.
2. Engage factory-authorized service representative to administer and perform tests and inspections on components, assemblies, and equipment installations, including connections.
3. Administer and perform tests and inspections with assistance of factory-authorized service representative.

C. Tests and Inspections:
1. Visual Inspection: Conduct visual inspection prior to testing.
   a. Inspection must be based on completed record Drawings and system documentation that is required by "Completion Documents, Preparation" table in "Documentation" section of "Fundamentals" chapter in NFPA 72.
   b. Comply with "Visual Inspection Frequencies" table in "Inspection" section of "Inspection, Testing and Maintenance" chapter in NFPA 72; retain "Initial/Reacceptance" column and list only installed components.
2. System Testing: Comply with "Test Methods" table in "Testing" section of "Inspection, Testing and Maintenance" chapter in NFPA 72.
3. Factory-authorized service representative must prepare "Fire Alarm System Record of Completion" in "Documentation" section of "Fundamentals" chapter in NFPA 72 and "Inspection and Testing Form" in "Records" section of "Inspection, Testing and Maintenance" chapter in NFPA 72.

D. Reacceptance Testing: Perform reacceptance testing to verify proper operation of added or replaced devices and appliances.

E. Fire-alarm system will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

G. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

H. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.11 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system. Allow Owner to record training.

3.12 SOFTWARE SERVICE AGREEMENT

A. Comply with UL 864.

B. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software must include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

END OF SECTION

DIVISION 31



EARTHWORKS

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SECTION 31 1000
SITE CLEARING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clearing and grubbing.

B. Earth stripping and stockpiling.

C. Repair and restoration.

D. Debris removal.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

C. Section 01 5713 - Temporary Erosion and Sediment Control.

D. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.

E. Section 31 2200 - Grading: Topsoil removal.

1.03 REFERENCE STANDARDS

1.04 QUALITY ASSURANCE

A. Clearing Firm Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.

1.05 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: As specified in Section 31 2200 - Grading

PART 3 EXECUTION

3.01 SITE CLEARING

A. Comply with additional requirements specified in Section 01 7000 - Execution and Closeout Requirements.

B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

C. Identify potential runoff areas.

3.02 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate work with utility companies; notify before starting work and comply with local requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.
   1. Notify Architect not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Architect's written permission.

D. Protect existing structures and other elements that are to remain.

E. Install sedimentation barrier according to Section 01 5713 - Temporary Erosion and Sediment Control.

3.03 VEGETATION

A. Do not remove or damage vegetation beyond limits following limits:
   1. Paving: 10 feet each side of surface walkways, patios, surface parking, and utility lines less than 12 inches in diameter.

B. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.04 EARTH STRIPPING AND STOCKPILING

A. Stripping:
   1. Remove topsoil within identified area as indicated on drawings.

B. Stockpiling:
   1. Place topsoil in identified areas as indicated on drawings:
      a. Pile depth not to exceed 8 feet.

3.05 REPAIR AND RESTORATION

A. Remaining Existing Facilities, Utilities, and Site Features: If damaged due to this work, repair or replace to original condition.

B. Vegetation: Replace damaged or destroyed vegetation identified to remain as indicated on drawings at no cost to Owner:
   1. Outside removal limits.
   2. Inside protection limits.

3.06 DEBRIS

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and windblown debris from public and private lands.

3.07 CLEANING

A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.

B. Remove unused stockpiled subsoil. Grade stockpile area to prevent standing water.

C. Leave site clean and ready to receive work.

END OF SECTION

SECTION 31 2200
GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of topsoil.

B. Rough grading the site for site structures.

C. Finish grading.

1.02 RELATED REQUIREMENTS

A. Section 31 1000 - Site Clearing.

B. Section 31 2316 - Excavation.

C. Section 31 2323 - Fill: Filling and compaction.

D. Section 32 9219 - Seeding: Finish ground cover.

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with State of Minnesota, Highway Department of Transportation standards.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil: See Section 31 2323.

B. Other Fill Materials: See Section 31 2323.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Verify the absence of standing or ponding water.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

D. Notify utility company to remove and relocate utilities.

E. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

F. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.

G. Protect plants, lawns, and other features to remain as a portion of final landscaping.

3.03 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

D. Do not remove wet subsoil , unless it is subsequently processed to obtain optimum moisture content.

E. When excavating through roots, perform work by hand and cut roots with sharp axe.

F. See Section 31 2323 for filling procedures.

G. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key fill material to slope for firm bearing.

H. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

I. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04 SOIL REMOVAL AND STOCKPILING

A. Stockpile topsoil to be re-used on site; remove remainder from site.

B. Stockpile subsoil to be re-used on site; remove remainder from site.

C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.05 FINISH GRADING

A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.

C. Where topsoil is to be placed, scarify surface to depth of 3 inches.

D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.

E. Place topsoil in areas indicated.

F. Place topsoil to the following compacted thicknesses:
   1. Areas to be Seeded with Grass: 6 inches.

G. Place topsoil during dry weather.

H. Remove roots, weeds, rocks, and foreign material while spreading.

I. Near plants spread topsoil manually to prevent damage.

J. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

K. Lightly compact placed topsoil.

L. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.07 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect as to remedy.

C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.08 FIELD QUALITY CONTROL

A. See Section 31 2323 for compaction density testing.

3.09 CLEANING

A. Remove unused stockpiled topsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 31 2323
FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for footings, slabs-on-grade, paving, and utilities within the building.

B. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

A. Section 01 5713 - Temporary Erosion and Sediment Control: Slope protection and erosion control.

B. Section 03 3000 - Cast-in-Place Concrete.

C. Section 31 2200 - Grading: Site grading.

D. Section 31 2316 - Excavation: Removal and handling of soil to be re-used.

1.03 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

B. Subgrade Elevations: 4 inches below finish grade elevations indicated on drawings, unless otherwise indicated.

1.04 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).

D. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.

E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).

F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

H. ASTM D2940/D2940M - Standard Specification for Graded Aggregate Material for Bases or Subbases for Highways or Airports.

I. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

J. Minnesota Department of Transportation (Mn/DOT) Standard Specifications for Construction, Current Edition with all to date amendments.

1.05 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where indicated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. Unsatisfactory Fill:
   1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
   2. Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487, or a combination of these groups.

B. General Fill: Subsoil excavated on-site.
   1. Graded.
   2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
   3. Complying with ASTM D2487 Group Symbol GW, GP, GM, SW, SP, and SM, or a combination of these groups.

C. Aggregate Bedding: Graded mineral product meeting the requirements of MnDOT Specification 3149 - Aggregate Bedding.

D. Base Course Aggregate Fill. MnDOT Specification 3138 - Aggregate for Surface and Base Courses.

E. Bituminous Base Course: See Section 32 1216 - Asphalt Paving.

F. Coarse Filter Aggregate: MnDOT Specification 3149H. Coarse filter aggregate shall be free draining mineral product, excluding crushed carbonate quarry rock, crushed concrete, and salvaged bituminous mixture with 100 percent passing the 1 inch sieve size, 85-100 percent passing the 3/4 inch sieve size, 30-60 percent passing the 3/8 inch sieve size, and 0-10 percent passing the #4 sieve size.

G. Select Granular Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Granular Fill: Coarse aggregate, complying with State of Minnesota Department of Transportation standard.
   1. MnDOT Specification 3138 - Aggregate Base, Class 5 or other if approved.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.

B. Identify required lines, levels, contours, and datum locations.

C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

D. Verify structural ability of unsupported walls to support imposed loads by the fill.

E. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

1. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
    a. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
    b. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

G. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

H. Correct areas that are over-excavated.
1. Load-bearing foundation surfaces: Fill with concrete.
2. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

I. Reshape and re-compact fills subjected to vehicular traffic.

J. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 SUBBASE AND BASE COURSES

A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase and base course under pavements and walks as follows:
1. Place base course material over subbase course under hot-mix asphalt pavement.
2. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
3. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D698.

3.05 FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

B. Under Interior Slabs-On-Grade:
1. Use select granular fill.
2. Depth: 4 inches deep.
3. Compact to 95 percent of maximum dry density.
4. Tolerance: 1/2 inch when tested with a 10-foot straightedge.

C. At Foundation Walls and Footings:
1. Use select granular fill.
2. Fill up to subgrade elevation.
3. Compact each lift to 90 percent of maximum dry density.
4. Tolerance: 1/2 inch when tested with a 10-foot straightedge.
5. Do not backfill against unsupported foundation walls.
6. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

D. At Lawn Areas:
1. Use general fill.
2. Fill up to subgrade elevations.
3. Compact to 85 percent of maximum dry density.
4. Tolerance: Plus or minus 1 inch.

5. See Section 32 9119 for topsoil placement.

E. Under Monolithic Paving :
1. Compact subsoil to 95 percent of its maximum dry density before placing fill.
2. Use sand fill and base course aggregate fill at thickness indicated on drawings.
3. Tolerance: Plus or minus 1/2 inch.
4. Compact to 95 percent of maximum dry density.

F. Under Concrete Walks:
1. Use general fill.
2. Fill up to 4 inches below finish grade.
3. Maximum compacted depth of each lift: 8 inches.
4. Tolerance: Plus or minus 1 inch.
5. Compact to 92 percent of maximum dry density.

3.06 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Soil Fill Materials:
1. Compaction density testing will be performed on compacted fill in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
2. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor"), ASTM D1557 ("modified Proctor"), or AASHTO T 180.
3. If tests indicate work does not meet specified requirements, See Section 01 4000 for procedures.
4. Frequency of Tests: as follows:
a. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
b. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.

3.07 CLEANING

A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

DIVISION 32



EXTERIOR IMPROVEMENTS

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SECTION 32 9219
SEEDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hydroseeding, mulching and fertilizer.

B. Maintenance.

1.02 REFERENCE STANDARDS

A. MNDOT Standard Specification for Construction - 2020 Edition, and the “Supplemental Specifications” dated September 2022 shall govern.

1.03 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 PRODUCTS

2.01 SEED MIXTURE

A. Seed Mixture: MNDOT 25-151 and 25-141.

2.02 ACCESSORIES

A. Hydro-Mulching Material: MNDOT 3884 Type Hydraulic Mulch.

B. Fertilizer: MNDOT 3881 Type 3 - Slow release; to the following proportions:
   1. Nitrogen: 22 percent.
   2. Phosphoric Acid: 5 percent.
   3. Soluble Potash: 10 percent.

C. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this Section.

3.02 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after smooth raking of topsoil .

C. Do not apply fertilizer at same time or with same machine as will be used to apply seed.

D. Mix thoroughly into upper 2 inches of topsoil.

E. Lightly water to aid the dissipation of fertilizer.

3.03 HYDROSEEDING

A. Do not hydroseed area in excess of that which can be mulched on same day.

B. Immediately following seeding, apply mulch as per MNDOT.

C. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches.

3.04 PROTECTION

A. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Provide 12 inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.

B. Secure outside edges and overlaps at 36 inch intervals with stakes.

3.05 MAINTENANCE

A. Provide maintenance at no extra cost to Owner; Owner will not pay for water.

B. Provide maintenance of seeded areas for one months from Date of Seeding.

C. Water to prevent grass and soil from drying out.

D. Roll surface to remove minor depressions or irregularities.

E. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

F. Immediately reseed areas that show bare spots.

G. Protect seeded areas with warning signs during maintenance period.

H. At first Spring following Substantial Completion, reapply hydroseed to all bare areas larger than 4 by 4 inches.

END OF SECTION

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Alexandria, MN 56308
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Bemidji
315 5th Street NW
Suite 1
Bemidji, MN 56601
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Brainerd/Baxter
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Phone: 218-829-5117

Crookston
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PO Box 458
Crookston, MN 56716-0458
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Duluth
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PO Box 730
Wyoming, MN 55092
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FACILITY ASSESSMENT

EAST GRAND FORKS FIRE STATION NO. 2

CITY OF EAST GRAND FORKS, MINNESOTA

SEPTEMBER 2023

Table of Contents

EXECUTIVE SUMMARY 4
Fire Department Summary 4
- Communities Served 4
- Existing Facilities 4

Scope of Evaluation 4
- Purpose 4
- Scope of Assessment 4
- Priority Summary 5

Summary of Findings 5
- Facility Age 5
- Identified Needs 5
- Distribution 6
- Facility Condition 7
- Conclusion 7

PHYSICAL CONDITIONS 8
Site Conditions 8
- Fire Apparatus Drive Lanes 8
- Staff & Visitor Parking Location + Condition 8
- Accessible Parking Spaces + Access 8
- Sidewalks + Walkways 8

Exterior Building Conditions 9
- Walls + Siding 9
- Windows 9
- Exterior Doors 9
- Roofs 9

Interior Building Conditions 9
- Ceilings 9
- Interior Walls 9
- Floors 10
- Interior Doors 10
- Casework 10

Structural System Conditions 10

- Building Construction 10

Life Safety Conditions 10

- Fire Suppression + Code Requirements 10

Hazardous Material Conditions 10

- Asbestos & Lead-Based Paint 10

Accessibility Conditions 11

- Parking and Exterior Access 11
- Interior Walkways + Access 11
- Casework 11
- Restrooms 11

HVAC Conditions 11

- Heating System 11
- Air Conditioning System 12
- Air Distribution Systems 12
- Temperature Controls 13

Plumbing Conditions 13

- Domestic Water Service and System 13
- Domestic How Water System 13
- Sanitary Sewer System 13
- Plumbing Fixtures 13

Fire Protection Conditions 14

Electrical Conditions 14

- Power Distribution 14
- Lighting and Controls 15
- Network/IT System 15

Appendix 1 – Mechanical Equipment Summary 16

Appendix 2 – Prioritized Tasks and Estimated Costs 32

EXECUTIVE SUMMARY

Fire Department Summary

- *Communities Served*

  As indicated on the City of East Grand Fork's website, the fire department is a combination career/paid on call department, established in 1883. Serving the City of East Grand Forks and seven surrounding townships. Services provided include; EMS, fire suppression, technical rescue, fire code education/enforcement, fire prevention education/activities and emergency management. The fire department responds to approximately 1,000 emergency calls per year as well as several public service calls and public education events.

- *Existing Facilities*

  The East Grand Forks Fire Department operates two fire stations. The focus of this facility assessment is on Station No. 2 located at 243 5th Ave SE. Original construction drawings provided by the Department indicate the building was constructed in 1975. There have not been any significant changes to the building aside from regular maintenance and upkeep. The building fronts Bygland Road SE. Entrance to the garage bays is from the east.



Scope of Evaluation

- *Purpose*

  In May 2023, the East Grand Forks Fire Department authorized Widseth to conduct a facility condition assessment of Station No. 2. The purpose of this assessment will assist the fire department with:

  - Planning for maintenance and improvements
  - Prioritizing long- and short-term projects
  - Identifying opportunities to enhance the living environment for firefighters
  - Developing and enhancing a 10-year facilities maintenance plan.

- *Scope of Assessment*

  Widseth and its consultants visited Fire Station No. 2 to perform comprehensive site and facility evaluations. Review of the architectural and mechanical physical conditions was completed on June 16, 2023. Review of the electrical physical condition was completed on June 28, 2023. During the

physical conditions assessment process, fire department staff provided access to all areas, along with relevant information about the buildings and associated infrastructure.

- *Priority Summary*

  The building system conditions observed during our evaluation were prioritized using the following definitions and guidelines:

Priority	Category	Description
1	Life Safety	As typically noted by Fire Marshall or other Life Safety Officials.
	Deterioration	Further deterioration will create higher future repair costs or may cause damage to other areas of the structure.
	Health	Items that do not meet state health code requirements. Mechanical systems that do not currently comply with ASHRAE Standards. However, these upgrades are not mandated and would not be required unless other substantial work is being done to the facility.
	Accessibility	Items that must be completed to allow access to the building or primary function areas within the building.
	Haz. Materials	Items that pose a significant impact to building occupants.
2	Energy	Item results in payback within 10 years.
	Deterioration	Material or system that currently functions but will require replacement or major maintenance within 5 years.
	Health	Inadequate exhaust and ventilation near lab equipment or other areas lacking adequate ventilation.
	Accessibility	Modifications required to meet state guidelines.
	Haz. Materials	Removal of items affected by other Priority 2 changes.
3	Energy	Item results in payback in more than 10 years.
	Deterioration	Material or system that currently functions but will require replacement or major maintenance in 6-10 years.
	Health	Items that do not meet state health code requirements.
	Haz. Materials	Removal of items affected by other Priority 3 changes.
4	Aesthetics	Items which impact the visual environment.
	Accessibility	Items with do not meet full requirements of federal accessibility guidelines.
	Haz. Materials	Removal of items affected by other Priority 4 changes.

Summary of Findings

- *Facility Age*

  Fire Station No. 2 was constructed in 1975. Renovation occurred following the flood of 1997, but no significant changes have been to the facility since it's original construction. Improvements since original construction have consisted of routine maintenance and upkeep.

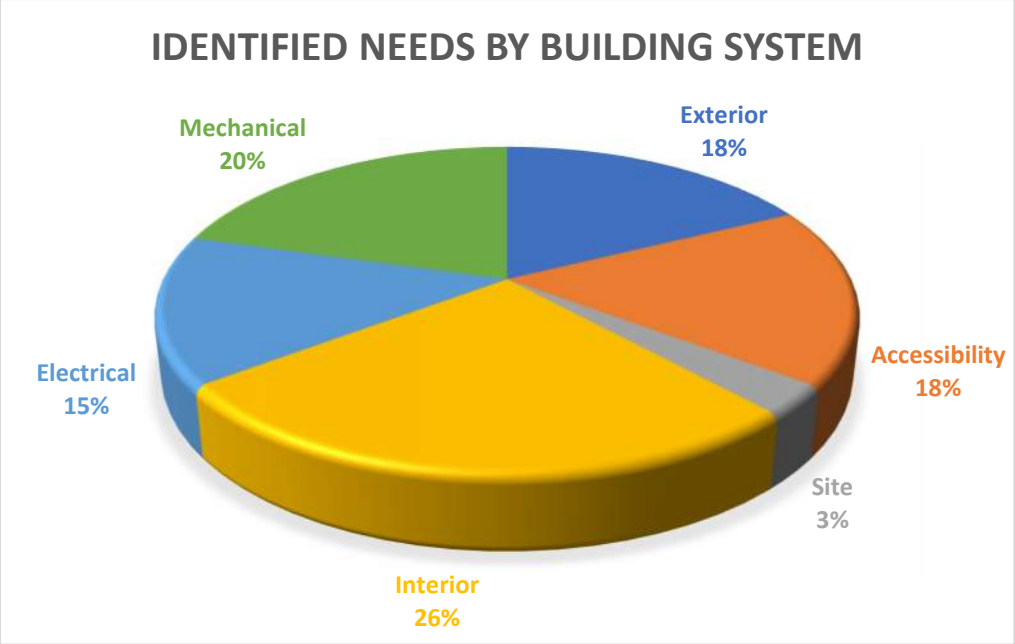
  During the assessment process, it was apparent that Station No. 2 is largely in its original condition with no major modifications to the original layout since construction.

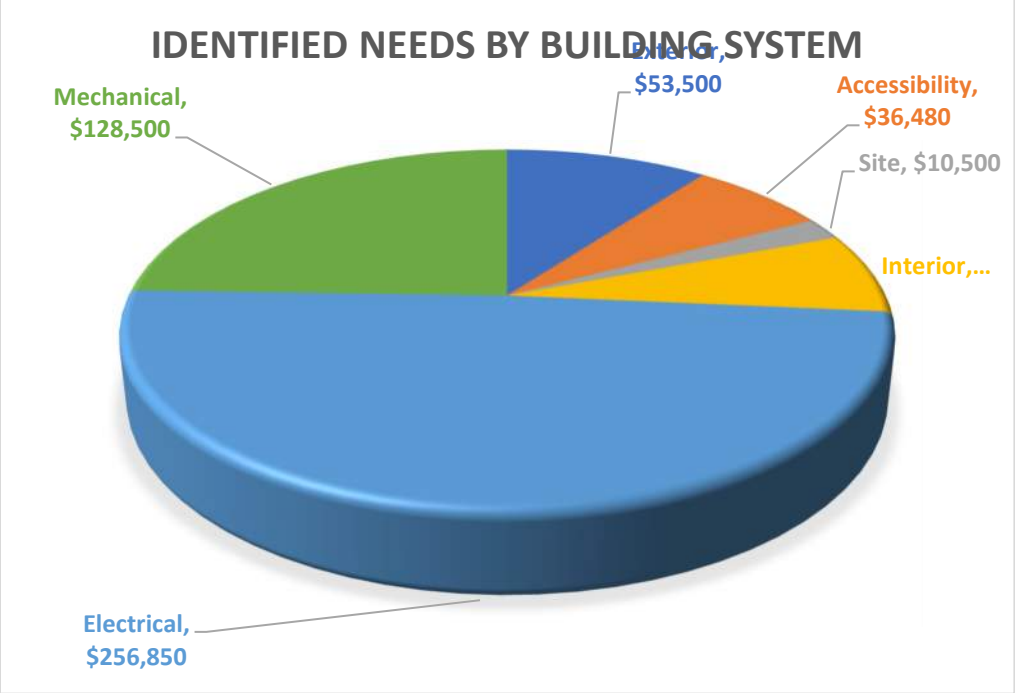
- *Identified Needs*

The assessment identified 34 items that should be addressed within the building and incorporated into the 10-year facilities plan. Over one-third of the items identified were priority 1 items that should be addressed within 3-5 years.

- *Distribution*

The building systems with needs identified were exterior, interior, accessibility, mechanical and electrical items.





- *Financial Impact*

  The assessment identified $523,950 worth of needs for the facility. Based on priority, a planned year of completion was assigned to each identified need. The following breaks down the identified needs by priority level:

  Priority 1: $279,850.00

  Priority 2: $201,600.00

  Priority 3: $10,000.00

  Priority 4: $32,500.00

- *Facility Condition*

  The facility was assessed for physical condition, repair, maintenance, capital renewal needs and remaining expected life. Items identified were described, categorized, and prioritized along with cost estimates for expenditure projections and reporting. Through these efforts, the facility could be assigned a Facility Condition Index (FCI) which is the cost of identified needs divided by the replacement cost ($400 per square foot) for the same square foot facility.

Facility	Area	Identified Needs	Replacement Value	Facility Condition Index	
Station 2	5,862	$523,950	$2,344,800	22.34%	FAIR

The facility condition index was initially sponsored by the National Association of College and University Business Officials (NACUBO) to provide a benchmark for comparing facilities. As a relative indicator of condition, ranges were established by NACUBO to assist with facility evaluations. Based on experience, value, financial conditions, and other factors, Widseth has developed alternative ranges for condition ratings.

Condition Rating	NACUBO FCI Range	Widseth FCI Range
GOOD	0 – 5%	0 – 15%
FAIR	5 – 10%	15 – 30%
POOR	10%+	30%+

Based on items identified, associated costs, and estimated replacement costs, Station No. 2 achieved an FCI of 22.34% with a rating of FAIR. As an FCI approaches 30% and a POOR rating, the question of replacement versus repair is typically raised. How the department responds to current and future needs should also be a factor in decision making for future investments.

- *Conclusion*

  The assessment was completed with the intent to provide the information and data necessary to allow the City of East Grand Forks to make informed decisions on planning for the future of the fire department and Station No. 2. Widseth and its consultants have not expressed or implied any conclusions within this assessment.

PHYSICAL CONDITIONS

Site Conditions

- *Fire Apparatus Drive Lanes*



Access to the apparatus bays occurs from the east side of the building through the staff and visitor parking lot. The access road is constructed out of bituminous asphalt. The bituminous throughout the driveway in front of the garage bay access has some cracking. The driveway generally drains to the south.

Exiting from the apparatus bays occurs from the west side of the building and directly out on to Bygland Road SE. The exit driveway is constructed out of concrete. The concrete in front of the apparatus bay garage doors was recently replaced and is in excellent condition. The western half coming off of the street has some cracking but is generally in good condition. The driveway generally drains to the west. Dumpsters are located away from the station in the northwest corner of the property

- *Staff & Visitor Parking Location + Condition*



The staff and visitor parking lot is located to the east of the station and is accessed by a driveway off of Bygland Road SE. The lot is constructed of bituminous with a concrete walkway along the west side which leads to the station. The lot provides 7 total striped parking stalls. There are no handicap accessible stalls designated. There is a bituminous drive along the south side of the building that leads to a storage building.

The lot is striped to allow two-way traffic flow. The striping within the lot is faded, but still visible.

The bituminous throughout the parking lot has some cracking which will lead to additional deterioration over time. The lot generally drains from northwest to southeast.

- *Accessible Parking Spaces + Access*

There are currently 7 parking stalls in the staff lot, none of which are identified as handicap accessible. According to the 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design, for a parking lot containing 7 stalls, a minimum of one stall must be handicap accessible and designated as van accessible. Currently, no van accessible stalls are marked.

- *Sidewalks + Walkways*



Concrete sidewalks are located along the south and east sides of the station. All entrances to the facility are accessible. The sidewalks that are set directly against the building were recently replaced and are in excellent condition. The sidewalk leading directly south from the main entrance is in good condition with only minor cracking. The sidewalk on the east side of the building leading to the parking lot is in fair condition and showing signs of significant pitting and some cracking.

Exterior Building Conditions

- *Walls + Siding*



The exterior walls consist of face brick with CMU backup walls. The exterior brick appears to be in generally good condition. Some minor chipping of bricks at outside building corners has occurred. Some cracking of the brick was observed at building corners, primarily on the east side of the building. The overhang from the apparatus bay over the living courters is showing deterioration on the underside. The existing grout appeared to generally be in good condition.



The amount of grout that needs repair and tuckpointing on the building is less than 5% of the overall wall area. All caulk joints at the exterior of the building should be routed out, and a backer rod and new sealant installed. These joints should be checked on an annual basis for deterioration and repair as needed to maintain the exterior wall system.

- *Windows*



The openings consisted of painted hollowmetal frames with operable clad windows set within. The clad wood windows appeared to be in fair condition. The hollowmetal frames were showing signs of rust and deterioration.

- *Exterior Doors*

All of the exterior doors consisted of hollow metal frames and doors. Exit doors from the living quarters consisted of full light door panels. Exits from the apparatus bays were flush doors. The doors and frames were generally in good condition and showing no signs of significant damage.

- *Roofs*

The low slope roofs consist of a ballasted EPDM membrane system. The roof system has been scheduled for replacement. The roof copings appeared to be in good condition.

Interior Building Conditions

- *Ceilings*

Most of the living quarter spaces consisted of 2-by-4 acoustical ceiling tile and grid system. The grid systems appeared to generally be in fair condition. The acoustical ceiling tiles appeared to be in fair condition and showing some deterioration throughout.

The remaining areas consisted of the exposed concrete roof structure, which had been painted. These ceilings appeared to be in good condition.

- *Interior Walls*

The interior of the existing building is consistent concrete masonry units. The condition of the CMU and paint are in excellent condition.

- *Floors*

  The flooring in the building consisted of a mix of carpet, VCT, and exposed concrete. The carpet in the living quarters was in fair condition. The carpet located in the laundry area was stained. VCT located in the kitchen and reception areas was in good shape, with the only notable area of significant deterioration and damage occurring at the east entrance. The porcelain tile located in the living quarters restroom was in fair condition. The grout was heavily stained. The exposed concrete floors in the remainder of the facility were in good condition.





- *Interior Doors*

  The interior door slabs consist of painted hollow metal doors and frames. Latching locksets consisted of cylindrical knob style lever handles. The doors were in good condition, showing little signs of wear and tear such as denting.

- *Casework*

  Much of the casework appears to consist of solid oak cabinets and plastic laminate countertops. Most of the cabinets appear to be in good condition. The countertops appeared to be in a fair condition.



Structural System Conditions

- *Building Construction*

  Most of the building appeared to be in good structural condition. The structure consists of load-bearing 8-inch concrete masonry units. Based on original drawings, there is no significant air cavity and only minimal insulation present in the original wall system. No significant structural issues were observed.

Life Safety Conditions

- *Fire Suppression + Code Requirements*

  The building's square footage is approximately 5,900 square feet. The building currently does not have a fire suppression system.

Hazardous Material Conditions

- *Asbestos & Lead-Based Paint*

  It is not known whether there has been a hazardous materials survey of the building to identify the presence of asbestos or lead-based paint. Because of the age of the facilities, we would recommend

that a survey be completed and kept on site for reference during any future maintenance work or improvements.

Accessibility Conditions



- *Parking and Exterior Access*

  Staff and visitor parking stalls are provided at a relatively flat and level surface, however there are not designated handicap parking stalls, and no curb ramps present to provide access.

- *Interior Walkways + Access*

  Within the building, the main hallway generally provides an accessible path to all areas of the building. However, most doorways between individual spaces lack the required clear floor area. Modifications to accommodate would require significant changes to the layout of the building. Main clearances required by current building codes would not be possible.

- *Casework*

  The cabinets and appliances within the kitchen area do not meet accessibility requirements. All work surfaces are located too high and lack the knee clearance space for wheelchairs. Access to the oven/range controls and refrigerator are not compliant.

- *Restrooms*

  The restroom does not meet many accessibility requirements. It lacks a wheelchair accessible toilet stall, the shower area is inaccessible, the lavatories lack the undercounter knee clearance and many of the accessories are mounted at non-compliance heights.



HVAC Conditions

- *Heating System*

  Natural gas serves as the heating fuel for the facility. In the office areas a packaged rooftop unit with gas heat and DX cooling is provided. Along the perimeter of these spaces electric unit heaters have been installed. In the vehicle bays the space is provided with standard efficiency gas unit heaters.

  Recommendation: The RTU system was replaced in 2016 and is in good condition, however the unit has some deficiencies. The unit does not have an outside air section and the unit is not equipped with economizer cooling. With the current setup, there is no fresh air being brought into the office space and there is no option for “free cooling”. A free cooling condition exists when the outside air temperature is cooler than the interior room temperature. On a call for cooling during this scenario, outside air can be brought in directly to the space in lieu of running compressors. The outside ductwork insulation and covers is in poor condition and should be replaced as well.

  If these modifications can take place on the existing unit it can remain, if not it is recommended the unit be replaced with a newer system that has the code required options. The replacement of the gas fired unit heaters with higher efficiency units and programmable thermostats would help lower energy costs as well as control the space in a much tighter temperature range.

- *Air Conditioning System*

  DX cooling has been provided as part of the packaged rooftop unit serving the office spaces. The vehicle bays have no air conditioning.

- *Air Distribution Systems*

  RTU-1 (Office Areas)

  The air distribution system serving this area is a single zone packaged rooftop unit equipped with gas heat and DX cooling. The system consists of three components: a central rooftop unit, a ductwork distribution system, and a space thermostat. The central air handling unit mixes fresh outside air with recycled return air. The air is then moved through a filter bank and then proceeds through the gas heat exchanger and dx cooling coil. Depending on which temperature condition is desired in the space, one of these two heat exchangers is on, and the air then proceeds to the ductwork distribution system by the air handling unit supply fan. The supply ducts move the air to each individual space. The single space temperature thermostat determines the temperature of the air being delivered to the office areas based upon the space temperature setpoint – this thermostat is located in the sleeping rooms. Ducted return air is then brought back to the unit where the cycle repeats.

  Recommendation: The system is in good condition and could remain. Modifications need to be made to the unit to get it up to current codes as addressed in the heating system section.

  VESTIBULES

  Electric cabinet heaters are shown on the original plans however upon inspection is looks like these units have been removed.

  SPECIAL EXHAUST

  Dedicated exhausts have been provided for the following areas:

  Toilet Rooms
  Janitors Closets
  Kitchen

  Recommendation: Replace the fans with newer units, upon visual inspection the units are in poor condition.

  A dedicated hose reel exhaust system has been provided for the Vehicle Bays. The system consists of sliding hose reel connection, a track, exhaust ductwork and a roof mounted utility set fan.

  Recommendation: Leave system as is.

- *Temperature Controls*

  There is no temperature control system installed in the facility. The majority of the equipment is served by single zone electric thermostats. The RTU-1 stat appears to have programming capabilities, however all the others do not.

  Recommendation: If equipment is recommended to be replaced, replace the stats with programmable ones otherwise leave the system as is.

Plumbing Conditions

- *Domestic Water Service and System*

  A 3" domestic water service enters the building on the south side of the vehicle bays where it feeds to the domestic water heater, fill lines for the fire trucks, and plumbing fixtures throughout the facility. Water distribution is piping copper with no lead solder joints.

  Recommendation: Leave the systems as is – replace insulation on piping where is has not been installed or has been removed and not replaced.

- *Domestic How Water System*

  An electric hot water heater provides domestic hot water to the facility and is in the office area in a mechanical room. Water distribution is piping copper with no lead solder joints.

  Recommendation: Leave the system as is.

- *Sanitary Sewer System*

  The sanitary sewer system enters the facility underground from the west and serves plumbing fixtures located throughout the facility. The piping is cast iron and is original to the facility. In discussions with the fire department, they noted the urinal plugs occasionally and they have had to auger out the main recently.

  Recommendation: The piping is coming up on the end of its useful life and due to ongoing maintenance, at a minimum it should be scoped to determine the integrity of the inside of the piping. This will help determine if a full replacement is required.

- *Plumbing Fixtures*

  Water closets are floor mounted, vitreous china with manually operated flush valves. Urinal is wall mounted, vitreous china with manually operated flush valves. Lavatories are wall mounted, vitreous china with manually operated faucets. Sinks in the kitchens are stainless steel, with manually operated faucets.

  Recommendation: Fixtures are in poor condition and have standard high flow rates. It is our recommendation that the units be replaced with low flow type automatic fixtures.

Fire Protection Conditions

There is no fire protection system within the facility.

Recommendation: Leave building as is as there is no code requirement for automatic sprinklers in this building.

Electrical Conditions

- *Power Distribution*



The existing electrical power distribution system is original to the 1975 building. The existing panels are manufactured by FPE, which is no longer available. The existing switchgear is out of date and has exceeded it's useful life. The existing service panel and all distribution panels should be replaced. Replacing the existing switchgear will provide a safer electrical system.



The existing generator and automatic transfer switch have also exceeded it's useful life. The existing generator is a portable generator that appears to have been acquired from the military. The transfer switch does not have current safety features. It is recommended that both the generator and transfer switch be replaced and the generator be installed as a permanent installation.



Because the garage area is used for light maintenance and storage of the fire trucks, the area from the floor to 18-inches above the floor is considered a hazardous area. Therefore, any electrical in that area should be done in a manner that meets Code. The conduits coming up through the floor require seal-offs, which are not currently installed. It is recommended that seal-offs be installed in all conduits through the floor for Code compliance.

In addition, the following is noted:

1. The existing overhead door operators are also outdated and should be replaced.
2. Ground Fault circuit interrupter (GFCI) protection is required for receptacles in bathrooms and kitchens. Receptacles in these areas should be replaced to comply with current Code requirements.
3. Add a drop cord receptacle to each truck bay for maintenance and charging use.
4. Add receptacles for charging radios at reception desk and dispatch.
5. Remove electric cove heaters since they are no longer working and not effective.
6. Remove existing electric heater in garage. This heater has not been in working condition and is not needed.

7. A reader board sign is planned for public messages. Power shall be provided for this sign.

These recommendations are proposed for a safer electrical system, Code compliance, and better functionality of the spaces.

- *Lighting and Controls*



The existing interior light fixtures are fluorescent type and original to the 1975 building. The outdoor building lighting has been replaced with LED lighting; however, the parking lot light is original and inadequate. The parking lot light should be upgraded to provide a safer environment. The existing exit lights are outdated and should also be replaced.

It is recommended that all the interior lighting be replaced with LED energy efficient lighting. Replacing lighting will provide for better energy efficiency and reduced maintenance costs.

When replacing light fixtures, a number of lights should be circuited to the emergency panel to provide for emergency lighting. If a permanent generator will not be provided, additional battery operated lights should be implemented to provide emergency lighting and to comply with Codes for emergency lighting.

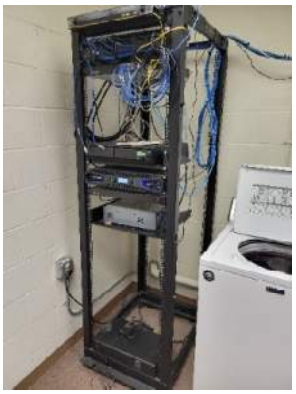
There is a flag pole with the US flag on the front side of the building. It was observed that there is no light for the flag. A US flag is required to be lit at night. A light shall be provided as required.



The existing lighting controls do not comply with current energy codes. Lighting controls that provide for automatic shutoff and dimming where required are recommended to be implemented. In addition, some existing switching is no longer used and new switching should provide for a simple and more effective lighting control system.

New light fixtures and lighting controls will provide better energy efficiency and reduced maintenance costs.

- *Network/IT System*



The existing network system consists of Cat 5e cable. This cable is outdated and should be replaced. In addition to updating cable, patch panels and wireless access points should also be replaced.

The existing PA/sound system is in need of upgrading. Additional coverage is needed in the bunk and shower areas.

Appendix 1 – Mechanical Equipment Summary

AHU

LOCATION: ROOFTOP

MANUFACTURER	Ruud
MODEL #	RKNN-A060CM13E
SERIAL #	F351600611
CONDITION	GOOD
RECOMMENDATION	REPAIR OR REPLACE
REMARKS	UNIT HAS NO FRESH AIR INTAKE OR ECONOMIZER FOR FREE COOLING.



WATER HEATER

LOCATION: ROOF ACCESS ROOM

MANUFACTURER	State Industries
MODEL #	SB6120 26 SFE NSF
SERIAL #	H97090369
CONDITION	GOOD
RECOMMENDATION	LEAVE AS IS
REMARKS	



HOSE REEL EXHAUST SYSTEM

LOCATION: VEHICLE BAY

MANUFACTURER	Nederman
MODEL #	VARIOUS
SERIAL #	VARIOUS
CONDITION	GOOD
RECOMMENDATION	LEAVE AS IS
REMARKS	



HOSEREEL EXHAUST SYSTEM FAN

LOCATION: ROOFTOP

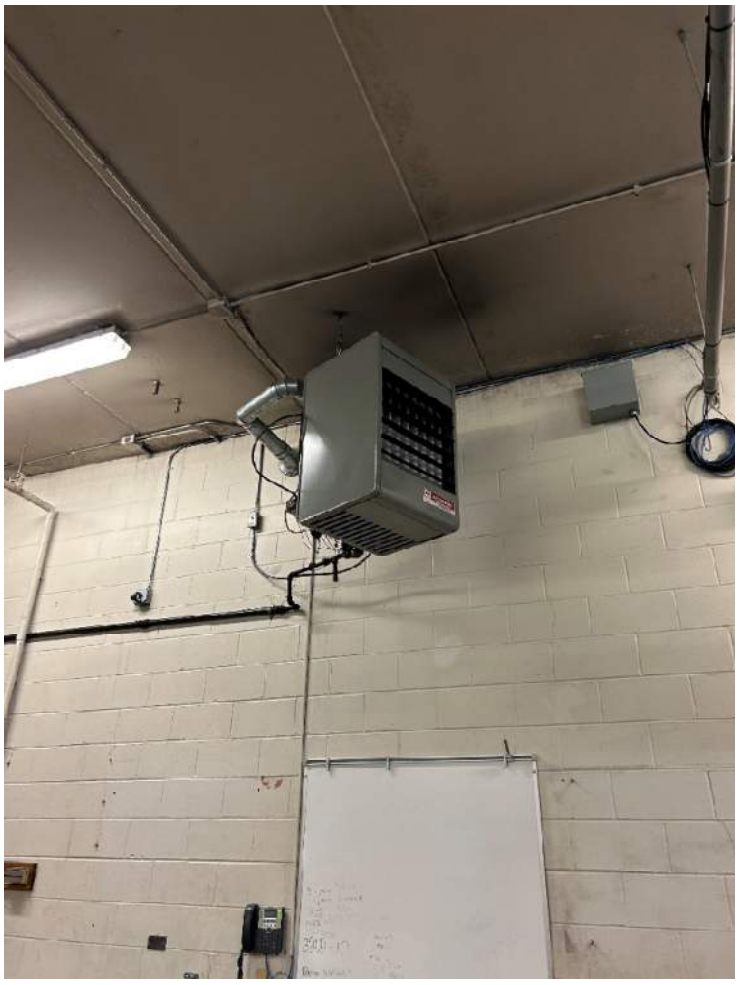
MANUFACTURER	Cincinnati Fan
MODEL #	HDBI-150
SERIAL #	2003861-1
CONDITION	GOOD
RECOMMENDATION	LEAVE AS IS
REMARKS	



UNIT HEATERS

LOCATION: VEHICLE BAY

MANUFACTURER	MODINE
MODEL #	PV 145AE0130
SERIAL #	300811020796-5323
CONDITION	POOR
RECOMMENDATION	REPLACE
REMARKS	REPLACE WITH HIGH EFFICIENCY UNIT.



EXHAUST FAN 1

LOCATION: ROOFTOP

MANUFACTURER	UNKNOWN
MODEL #	UNKNWON
SERIAL #	UNKNOWN
CONDITION	POOR
RECOMMENDATION	REPLACE
REMARKS	



EXHAUST FAN 2

LOCATION: ROOFTOP

MANUFACTURER	UNKNOWN
MODEL #	UNKNWON
SERIAL #	UNKNOWN
CONDITION	POOR
RECOMMENDATION	REPLACE
REMARKS	



EXHAUST FAN 3

LOCATION: ROOFTOP

MANUFACTURER	UNKNOWN
MODEL #	UNKNWON
SERIAL #	UNKNOWN
CONDITION	POOR
RECOMMENDATION	REPLACE
REMARKS	



EXTERIOR ROOF DUCTWORK

LOCATION: ROOFTOP

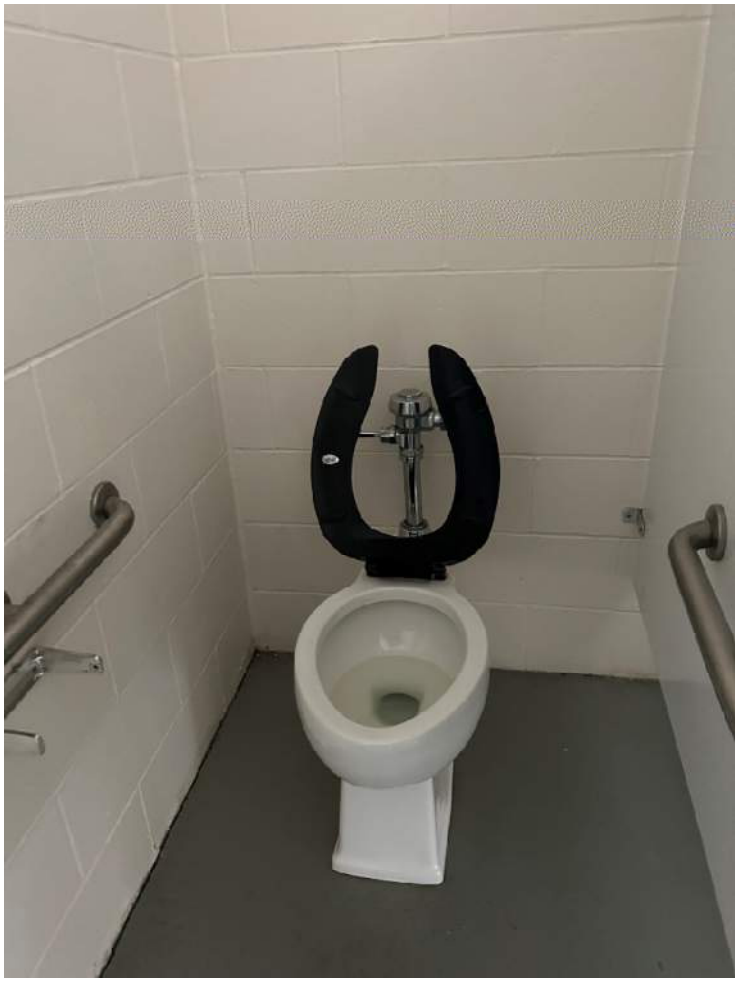
MANUFACTURER	N/A
MODEL #	N/A
SERIAL #	N/A
CONDITION	POOR
RECOMMENDATION	REPLACE
REMARKS	DUCTWORK IS NOT INSULATED AND THE SEALING ON IT IS DETERIORATING.



PLUMBING FIXTURE 1

LOCATION: BATHROOM

MANUFACTURER	N/A
MODEL #	N/A
SERIAL #	N/A
CONDITION	FAIR
RECOMMENDATION	REPLACE
REMARKS	UNIT DOES NOT APPEAR TO BE ADA COMPLIANT, HOWEVER GRAB BARS ARE IN THE STALL MEANING THE FIXTURE SHOULD BE.



PLUMBING FIXTURE 2

LOCATION: BATHROOM

MANUFACTURER	N/A
MODEL #	N/A
SERIAL #	N/A
CONDITION	POOR
RECOMMENDATION	REPLACE
REMARKS	FIXTURE DRAIN IS NOT ADA COMPLIANT. FAUCETS ARE HIGH FLOW UNITS.



ELECTRIC HEATERS

LOCATION: LIVING ROOM

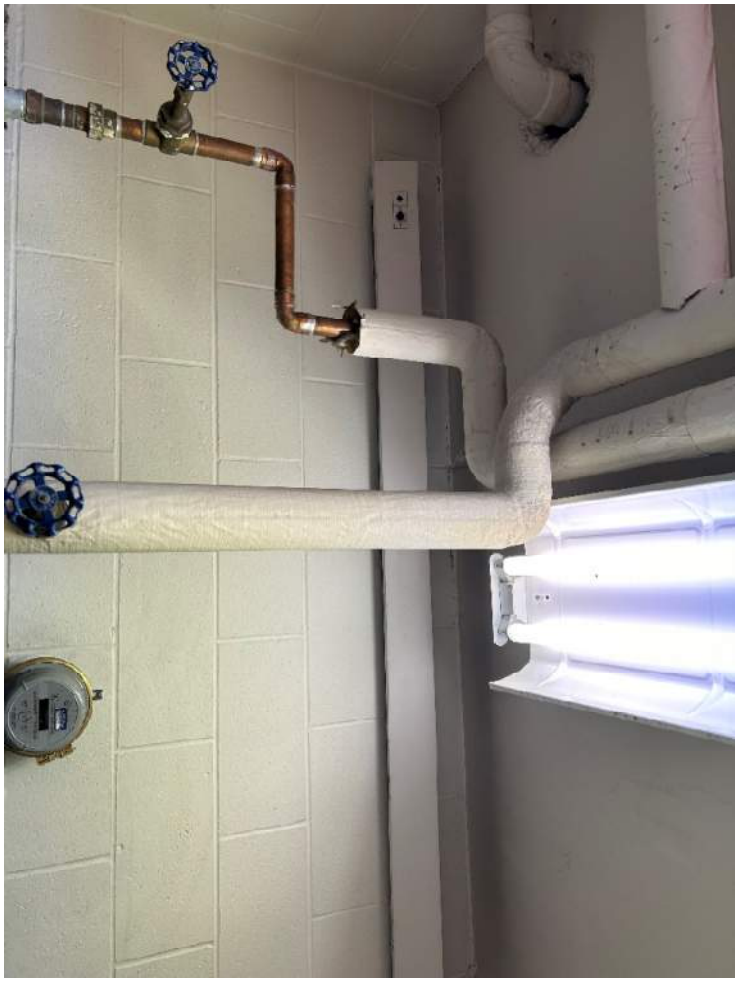
MANUFACTURER	N/A
MODEL #	N/A
SERIAL #	N/A
CONDITION	FAIR
RECOMMENDATION	LEAVE AS IS
REMARKS	



DOMESTIC WATER PIPING

LOCATION: VARIOUS

MANUFACTURER	N/A
MODEL #	N/A
SERIAL #	N/A
CONDITION	FAIR
RECOMMENDATION	LEAVE AS IS
REMARKS	INSULATION SHOULD BE REPLACED WHERE NOT INSTALLED AND REPAIRED WHERE DAMAGED.



ROOF DRAINAGE PIPING

LOCATION: VEHICLE BAY

MANUFACTURER	N/A
MODEL #	N/A
SERIAL #	N/A
CONDITION	FAIR/POOR
RECOMMENDATION	LEAVE AS IS
REMARKS	IN THE NEXT TEN YEARS THIS PIPE WILL DETERIORATE TO THE POINT IT NEEDS REPLACEMENT.



INTERIOR DUCTWORK

LOCATION: VARIOUS

MANUFACTURER	N/A
MODEL #	N/A
SERIAL #	N/A
CONDITION	FAIR
RECOMMENDATION	LEAVE AS IS
REMARKS	INSULATION APPEARS TO BE LINED HOWEVER IS NOT EXTERNALLY INSUALTED. THE PROVIDED LINING WOULD NOT PASS CURRENT INSULATION CODES.

Appendix 2 – Prioritized Tasks and Estimated Costs

Building System	Item Description	Priority	Planned Year	2023 Estimated Cost
Exterior	Replace damaged brick on exterior of building.	4	2033	$1,000.00
Exterior	Repair overhang and apparatus bay	4	2033	$10,000.00
Exterior	Tuckpoint deteriorated areas. Approximately 5% of exterior.	3	2029	$10,000.00
Exterior	Route out and re-caulk exterior building joints	1	2024	$5,000.00
Exterior	Replace exterior windows	1	2025	$24,500.00
Accessibility	Restripe and sign parking lot to provide handicap accessible stalls	1	2024	$1,000.00
Site	Replace sidewalk on east side of building leading to parking lot	2	2026	$10,500.00
Interior	Replace acoustical tile ceiling system	2	2027	$4,320.00
Interior	Replace carpet throughout facility	2	2027	$5,340.00
Interior	Replace wall base throughout facility	2	2027	$720.00
Interior	Repair VCT at east entrance	1	2024	$1,000.00
Interior	Replace VCT throughout facility	2	2027	$2,490.00
Interior	Replace porcelain tile in restroom	2	2025	$4,200.00
Interior	Replace countertops at cabinets	2	2026	$3,750.00
Accessibility	Provide curb ramps at parking lot sidewalk.	1	2024	$5,000.00
Accessibility	Restrooms do not meet ADA requirements, should be remodeled	1	2025	$10,000.00
Accessibility	Replace all locksets with lever style	1	2025	$10,000.00
Exterior	Replace exterior doors in apparatus bay	2	2025	$3,000.00
Interior	Repaint apparatus bay	2	2026	$15,800.00
Accessibility	Cabinets in breakroom lack accessibility components, replace	2	2026	$6,480.00
Accessibility	Replace appliances with accessible units	2	2026	$4,000.00
Interior	Replace window blinds	1	2025	$500.00
Electrical	Electrical power distribution system upgrades outlined in report	1	2025	$76,500.00
Electrical	Upgrades to lighting and lighting controls outlined in report	1	2025	$71,150.00
Electrical	Upgrade network system as outlined in report	4	2033	$21,500.00
Electrical	Upgrade PA/sound system as outlined in report	2	2025	$12,500.00
Electrical	Replace generator and ATS	1	2025	$75,200.00
Mechanical	Add economizer/fresh air to RTU	2	2026	$6,500.00
Mechanical	Replace outside air	2	2026	$5,000.00
Mechanical	Replace exhaust fans	2	2026	$15,000.00
Mechanical	Gas fired unit heaters	2	2026	$15,000.00
Mechanical	Pipe insulation allowance	2	2026	$5,000.00
Mechanical	Replace underground sewer	2	2026	$40,000.00
Mechanical	Replace plumbing fixtures	2	2025	$42,000.00

Facility Total: $ 523,950

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

CITY OF EAST GRAND FORKS

243 5TH AVE SE, EAST GRAND FORKS, MN 56721



SHEET INDEX	
SHEET #	**SHEET NAME**
GENERAL	
G1.10	TITLE SHEET
G2.10	CODE INFO - DOOR CLEARANCE, ACCESS. ROUTES
G2.20	CODE INFO - TOILET ROOMS, MISC
G2.30	CODE INFO - STAIRS, RAMPS, ELEVATORS, SITE
LIFE SAFETY	
LS1.10	LIFE SAFETY
ARCHITECTURAL DEMOLITION	
AD1.10	DEMOLITION PLAN
ARCHITECTURAL	
A1.10	FLOOR PLAN
A2.10	REFLECTED CEILING & ROOF PLAN
A4.10	BUILDING ELEVATIONS
A7.10	INTERIOR ELEVATIONS
A8.10	DETAILS
A8.11	ROOF DETAILS
A9.10	DOOR AND FRAME TYPES AND SCHEDULES
MT	
M0.00	MECHANICAL COVER SHEET
M0.01	MECHANICAL SPECIFICATIONS
M0.02	MECHANICAL SPECIFICATIONS
M0.03	MECHANICAL SPECIFICATIONS
M0.04	MECHANICAL SPECIFICATIONS
M0.05	MECHANICAL SPECIFICATIONS
M0.06	MECHANICAL SPECIFICATIONS
M0.07	MECHANICAL SPECIFICATIONS
M0.08	MECHANICAL SPECIFICATIONS
M0.09	MECHANICAL SPECIFICATIONS
M0.10	MECHANICAL SPECIFICATIONS
M0.11	MECHANICAL SPECIFICATIONS
M0.12	MECHANICAL SPECIFICATIONS
M	
M3.00	HVAC PLAN - FIRST FLOOR
M3.01	HVAC PLAN - ROOF
M5.00	PLUMBING DETAILS
M5.01	MECHANICAL DETAILS
M5.02	PLUMBING SCHEDULES

SHEET INDEX	
SHEET #	**SHEET NAME**
M5.03	MECHANICAL SCHEDULES
M6.00	CONTROLS
MD	
MD3.00	HVAC PLAN - FIRST FLOOR DEMOLITION
MD3.01	HVAC PLAN - ROOF DEMOLITION
PD	
MD1.00	PLUMBING PLAN - UNDERFLOOR DEMOLITION
MD1.01	PLUMBING PLAN - FIRST FLOOR DEMOLITION
P	
M1.00	PLUMBING PLAN - UNDERFLOOR
M1.01	PLUMBING PLAN - FIRST FLOOR
M1.02	PLUMBING DIAGRAMS
ELECTRICAL	
E0.01	ELECTRICAL SYMBOLS, SPECIFICATIONS AND SHEET INDEX
ELECTRICAL	
ED1.01	FIRST LEVEL FLOOR PLAN - ELECTRICAL DEMOLITION
ED1.02	ROOF PLAN - ELECTRICAL DEMOLITION
ELECTRICAL	
E0.02	ELECTRICAL DETAILS
E1.01	SITE PLAN - ELECTRICAL
E2.01	FIRST LEVEL FLOOR PLAN - LIGHTING
E3.01	FIRST LEVEL FLOOR PLAN - POWER
E3.02	ROOF PLAN - POWER
E4.01	FIRST LEVEL FLOOR PLAN - SYSTEMS
E6.01	ONE-LINE DIAGRAM
E6.11	PANEL SCHEDULES
E7.01	LIGHT FIXTURE SCHEDULE
E8.01	DETAILS
# OF SHEETS: 53	

ABBREVIATIONS

@	AT	E	EAST	HB	HOSE BIBB	PT	PAINT	SSTL	STAINLESS STEEL
AFF	ABOVE FINISHED FLOOR	EA	EACH	HWH	HOT WATER HEATER	PR	PAIR	STD	STANDARD
AP	ACCESS PANEL	EF	EACH FACE	HR	HOUR	PNL	PANEL	STL	STEEL
ACT	ACOUSTIC CEILING TILE	EW	EACH WAY			PB	PANIC BAR	SJ	STEEL JOIST
A/C	AIR CONDITIONING	ELECT	ELECTRICAL (AL)	ID	INSIDE DIAMETER	PTD	PAPER TOWEL DISPENSER	STO	STORAGE
AB	ANCHOR BOLT	EWC	ELECTRIC WATER COOLER	INS	INSULATE (D),(ION),(ING)	PTR	PAPER TOWEL RECEPTOR	STR	STRUCTURAL
ALT	ALTERNATE	EL	ELEVATION	INT	INTERIOR	PAR	PARALLEL	SUS	SUSPENDED
AL	ALUMINUM	ELEV	ELEVATOR			PBD	PARTICLE BOARD	SYM	SYMMETRICAL
∠	ANGLE	EQ	EQUAL	JT	JOINT	PTN	PARTITION	SYS	SYSTEM
APX	APPROXIMATE	EQP	EQUIPMENT	JST	JOIST	PVMT	PAVEMENT		
ARCH	ARCHITECTURAL	EXIST	EXISTING			PERF	PERFORATE (ED)	TKBD	TACK BOARD
		EXP	EXPANSION	LB	LAG BOLT	PERI	PERIMETER	TKS	TACK STRIP
BSMT	BASEMENT	EB	EXPANSION BOLT	LAM	LAMINATE (ED)	PLAS	PLASTER	TEL	TELEPHONE
BM	BEAM or BENCHMARK	EJT	EXPANSION JOINT	LAV	LAVATORY	PLAM	PLASTIC LAMINATE	TV	TELEVISION
BRG	BEARING	EXT	EXTERIOR	LH	LEFT HAND	PL OR P	PLATE	TZ	TERRAZZO
BPL	BEARING PLATE			L	LENGTH	PLBG	PLUMBING	THK	THICK (NESS)
BIT	BITUMINOUS	FB	FACE BRICK	LT	LIGHT	±	PLUS OR MINUS	THR	THRESHOLD
BLK	BLOCK	FOC	FACE OF CONCRETE	LL	LIVE LOAD	PWD	PLYWOOD	TPTN	TOILET PARTITION
BLKG	BLOCKING	FOM	FACE OF MASONRY	LLH	LONG LEG HORIZONTAL	PT	POINT	TPD	TOILET PAPER DISPENSER
BRK	BRICK	FOS	FACE OF STUDS	LLV	LONG LEG VERTICAL	LBS	POUNDS	T&G	TONGUE AND GROOVE
BLDG	BUILDING	FIN	FINISH	LVR	LOUVER	PSI	POUNDS PER SQUARE INCH	TO	TOP OF
BO	BOTTOM OF	FFE	FINISHED FLOOR ELEVATION			PC	PRECAST	TOB	TOP OF BLOCK
		FRBK	FIRE BRICK	MFR	MANUFACTURER	PFN	PREFINISHED	TOD	TOP OF DECK
CAB	CABINET	FE	FIRE EXTINGUISHER	MAS	MASONRY			TOS	TOP OF STEEL
CPT	CARPET (ED)	FEC	FIRE EXTINGUISHER CABINET	MO	MASONRY OPENING	QT	QUARRY TILE	T	TREAD
CSMT	CASEMENT	FP	FIRE PROOF	MAT	MATERIAL (S)			TYP	TYPICAL
CI	CAST IRON	FLG	FLASHING	MAX	MAXIMUM	RAD	RADIUS		
CB	CATCH BASIN	FLR	FLOOR (ING)	MECH	MECHANICAL	REFR	REFRIGERATOR	UG	UNDERGROUND
CLG	CEILING	FD	FLOOR DRAIN	MC	MEDICINE CABINET	RE	REINFORCE (D), (ING), (MENT)	UNF	UNFINISHED
CL	CENTERLINE	FT	FOOT	MED	MEDIUM	REF	REFERENCE	UNO	UNLESS NOTED OTHERWISE
CHL	CHANNEL	FTG	FOOTING	MBR	MEMBER	REQ'D	REQUIRED	UR	URINAL
CHBD	CHALKBOARD	FND	FOUNDATION	MMB	MEMBRANE	RA	RETURN AIR		
CO	CLEANOUT	FRA	FRESH AIR	MTL	METAL	RVS	REVERSE	VB	VAPOR BARRIER
CLR	CLEAR	FBO	FURNISHED BY OTHERS			REV	REVISION	VNR	VENEER
CL	CLOSET	FUR	FURRED(ING)	M=L	MICROLAM	RH	RIGHT HAND	VERT	VERTICAL
COL	COLUMN	FUT	FUTURE	MIN	MINIMUM	ROW	RIGHT OF WAY	VEST	VESTIBULE
CONC	CONCRETE			MIR	MIRROR	R	RISER	VIN	VINYL
CMU	CONCRETE MASONRY UNIT	GAL	GALVANIZED	MISC	MISCELLANEOUS	RD	ROOF DRAIN	VCT	VINYL COMPOSITE TILE
CONST	CONSTRUCTION	GI	GALVANIZED IRON	MLD	MOLDING	RM	ROOM		
CONT	CONTINUOUS	GA	GAUGE	MRCT	MOISTURE RESISTANT CEILING TILE	RO	ROUGH OPENING	WH	WALL HUNG
CONTR	CONTRACTOR	GC	GENERAL CONTRACTOR	MT	MOUNT (ED), (ING)			WC	WATER CLOSET
CJT	CONTROL JOINT	GL	GLASS	MULL	MULLION	SND	SANITARY NAPKIN DISPENSER	WP	WATERPROOFING
		GB	GRAB BAR			SNR	SANITARY NAPKIN RECEPTOR	WWF	WELDED WIRE FABRIC
DL	DEAD LOAD	GD	GRADE(ING)	NOM	NOMINAL	SCH	SCHEDULE	W	WEST OR WIDTH, WIDE
°	DEGREE(S)	GYP BD	GYPSUM BOARD	N	NORTH	SEC	SECTION	WDW	WINDOW
DEPT	DEPARTMENT			NIC	NOT IN CONTRACT	SHT	SHEET	WG	WIRED GLASS
DTL	DETAIL	HDW	HARDWARE	NTS	NOT TO SCALE	SHTH	SHEATHING	WM	WIRE MESH
DIAM	DIAMETER	HDR	HEADER	NO or #	NUMBER	SIM	SIMILAR	W/	WITH
DIM	DIMENSION	HTG	HEATING			SC	SOLID CORE	W.O	WITHOUT
DPR	DISPENSER	HVAC	HEATING/VENTILATION/AIR CONDITIONING	OC	ON CENTER	SABI	SOUND ATTENUATING BATT INSULATION	WD	WOOD
DR	DOOR	HD	HEAVY DUTY	OPP	OPPOSITE	SP	SOUNDPROOF	WI	WROUGHT IRON
DH	DOUBLE HUNG	HT	HEIGHT	OSB	ORIENTED STRAND BOARD	S	SOUTH		
DN	DOWN	HC	HOLLOW CORE	OD	OUTSIDE DIAMETER	SPK	SPEAKER		
DS	DOWNSPOUT	HM	HOLLOW METAL	OA	OVERALL	SPEC	SPECIFICATION (S)		
DWG	DRAWING	HOR	HORIZONTAL	OH	OVERHEAD	SQ	SQUARE		
DF	DRINKING FOUNTAIN								

TYPICAL MATERIAL HATCH PATTERNS

ALUMINUM
EARTH
GLUE-LAMINATE CONSTRUCTION
RIGID INSULATION
PLYWOOD
BATT INSULATION
EIFS
GRANULAR FILL
SPRAY FOAM INSULATION
SEALANT
BRICK
EXPANSION JOINT
GROUT
MARBLE
STONE
CMU/MASONRY
FIRE BRICK
GYPSUM BOARD
MEMBRANE ROOFING
TILE
CONCRETE
GLASS
INSULATION BOARD
METAL
WOOD

TYPICAL SYMBOLS & TAGS

TYP. SYMBOLS

CENTERLINE SYMBOL
EXIT SYMBOL
GLASS SYMBOL
TEMPERED GLASS (T)
DRINKING FOUNTAIN (DF)
FIRE EXTINGUISHER CABINET (FEC)
FIRE EXTINGUISHER (FE)
TRUE NORTH ARROW (N)

VIEW REFERENCE LEGEND

BUILDING ELEVATION MARK (REF, 1, A1.10, DETAIL #, SHEET #)
VIEW REFERENCES (1/A1.10 SHEET # DETAIL #; A1.10 SHEET #)
INTERIOR ELEVATION MARK (SIM, 1, A1.10, DETAIL #, SHEET #)
CALLOUT HEAD (SIM, 1, A1.10, VIEW #, SHEET #)
SECTION HEAD (SIM, 1, A1.10, VIEW #, SHEET #)
PHASING LEGEND: EXISTING; DEMOLITION; NEW CONSTRUCTION
GRIDS: 0 EXISTING GRID SYMBOL; 0 NEW/STANDARD GRID SYMBOL
GRAPHIC SCALE: GRAPHIC SCALE: 1/8" (0' 12'-0" 24'-0")

STANDARD TAGS

CASEWORK TAG	XWWHHDD ← <TYPE> WWHHDD
CEILING TAG	CLG-# ← CEILING TYPE; 8'-0" ← CEILING HEIGHT
KEYED PLAN NOTES NEW & DEMO	1 ← NEW NOTE #; D1 ← DEMO NOTE #
DOOR TAGS	101 ← DOOR #
EXT MATERIAL ID TAG	XXX-## ← MATERIAL ID #
REVISION TAG	1 ← REVISION #
ROOM TAGS EXISTING, NEW	ROOM NAME ### ← ROOM #
WALL TAGS	EW9 ← WALL TAG; A4.48 ← W/ SUBSCRIPT
RATED WALL TAG	1B ← RATING
WINDOW TAGS	W### ← WINDOW INSTANCE #

DESIGN TEAM:

ARCHITECTURAL: Widseth, 3590 S 42nd St, Grand Forks, ND 58201, Office Phone: (701) 795-1975, Contact: **Brent Dammann**, Phone: **701-765-8005**

CIVIL: Widseth, 1600 Central Ave, East Grand Forks, MN 56721, Office Phone: (218) 773-1185, Contact: **Dustin Fanfulik**, Phone: **218-773-5641**

STRUCTURAL: Widseth, 610 Fillmore St, Alexandria, MN 56308, Office Phone: (320) 762-8149, Contact: **Derek Navratil**, Phone: **320-335-5019**

MECHANICAL: Martin Mechanical Design, 667 Demers Ave, Suite 2001, Grand Forks, ND 58102, Office Phone: (701) 941-5112, Contact: **Josh Lunski**, Phone: **218-779-4893**

ELECTRICAL: JB Electrical Design, 8340 89th Ave N, Brooklyn Park, MN 55445, Office Phone: (763) 486-0965, Contact: **Jeff Blake**, Phone: **763-486-0965**



VICINITY MAP

© 2025 WIDSETH SMITH NOLTING & ASSOCIATES, INC. 1/12/2026 12:38:44 PM SHEET 22x34

WIDSETH
ARCHITECTS ▪ ENGINEERS ▪ SCIENTISTS ▪ SURVEYORS

DRAWN BY: MATAIAH TURNER
CHECKED BY: BRENT DAMMANN

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

519

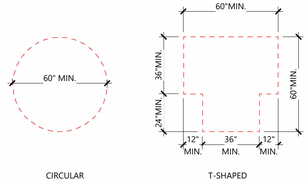
EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

TITLE SHEET

G1.10

PROJECT #: 2025-10872

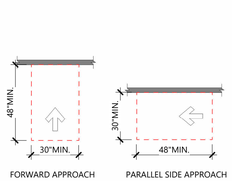
2025-10872
EAST GRAND FORKS FIRE STATION NO. 2 REMODEL



CIRCULAR

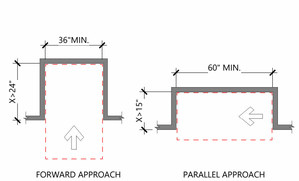
T-SHAPED

WHEEL CHAIR TURNING SPACE
(SECT 304.3)



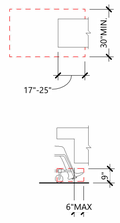
FORWARD APPROACH PARALLEL SIDE APPROACH

POSITION OF CLEAR FLOOR SPACE
(SECT 305.3)

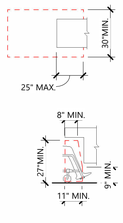


FORWARD APPROACH PARALLEL APPROACH

MANEUVERING CLEARANCE IN AN ALCOVE
(SECT 305.7)

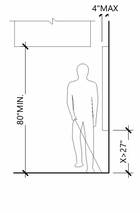


TOE CLEARANCE

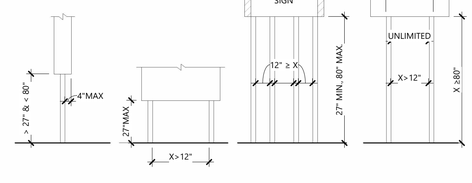


KNEE CLEARANCE

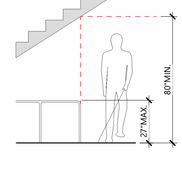
TOE CLEARANCE KNEE CLEARANCE
(SECT 306.2-3)



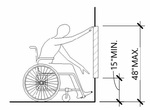
PROTRUDING OBJECTS
(SECT 307.2)



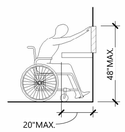
POST-MOUNTED PROTRUDING OBJECTS
(SECT 307.3)



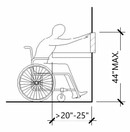
REDUCED VERTICAL CLEARANCE
(SECT 307.4)

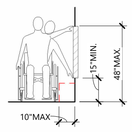


UNOBSTRUCTED FORWARD REACH
(SECT 308.2.1)

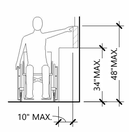


OBSTRUCTED FORWARD REACH
(SECT 308.2.2)

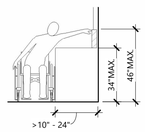


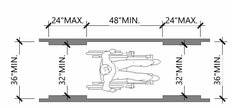


UNOBSTRUCTED SIDE REACH
(SECT 308.3.1)

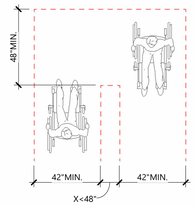


OBSTRUCTED HIGH SIDE REACH
(SECT 308.3.2)

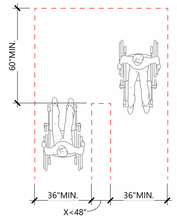




CLEAR WIDTH OF AN ACCESSIBLE ROUTE
(SECT 403.5)



180 DEGREE TURN



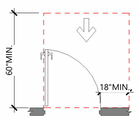
180 DEGREE TURN (EXCEPTION)

CLEAR WIDTH AT TURN
(SECT 403.5.2)

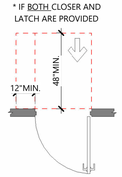


HINGED DOOR SLIDING DOOR FOLDING DOOR DOORWAYS WITHOUT DOORS

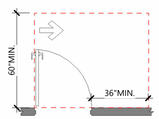
CLEAR WIDTH OF DOORWAYS
(SECT 404.2.2)



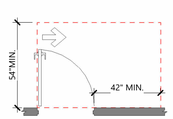
FRONT APPROACH, PULL SIDE



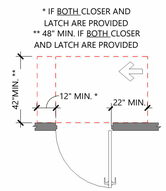
FRONT APPROACH, PUSH SIDE



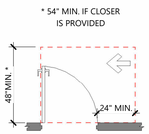
HINGE APPROACH, PULL SIDE



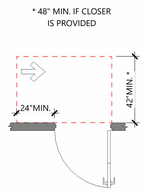
HINGE APPROACH, PULL SIDE



HINGE APPROACH, PUSH SIDE

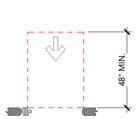


LATCH APPROACH, PULL SIDE

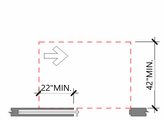


LATCH APPROACH, PUSH SIDE

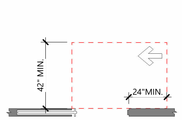
MANEUVERING CLEARANCE AT MANUAL SWINGING DOORS
(SECT 404.2.3.2)



FRONT APPROACH

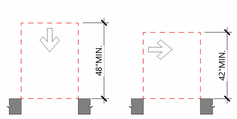


POCKET OR HINGE APPROACH



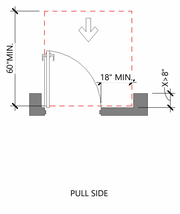
STOP OR LATCH APPROACH

MANEUVERING CLEARANCE AT SLIDING AND FOLDING DOORS
(SECT 404.2.3.3)



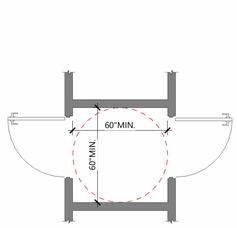
FRONT APPROACH SIDE APPROACH

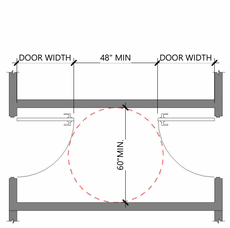
MANEUVERING CLEARANCE AT DOORWAYS WITHOUT DOORS
(SECT 404.2.3.4)

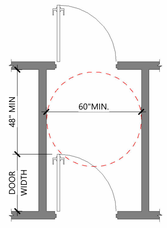


PULL SIDE PUSH SIDE PUSH SIDE, DOOR PROVIDED WITH BOTH CLOSER AND LATCH

MANEUVERING CLEARANCE AT RECESSED DOORS
(SECT 404.2.3.5)



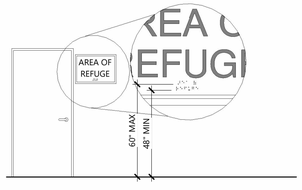




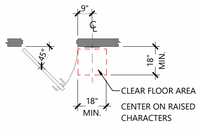
TWO DOORS IN A SERIES
(SECT 404.2.5)



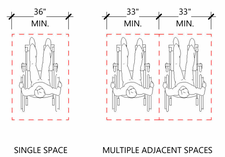
CHARACTER HEIGHT
(SECT 703.3.5)



HEIGHT OF BRAILLE AND RAISED CHARACTERS ABOVE FLOOR
(SECT 703.3.10 AND 703.4.5)



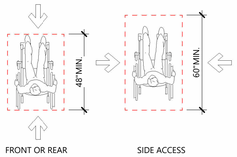
LOCATION OF SIGNS AT DOORS
(SECT 703.3.11)



SINGLE SPACE

MULTIPLE ADJACENT SPACES

WIDTH OF A WHEELCHAIR SPACE IN ASSEMBLY AREAS
(SECT 802.3)



FRONT OR REAR ACCESS SIDE ACCESS

DEPTH OF A WHEELCHAIR SPACE IN ASSEMBLY AREAS
(SECT 802.4)

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2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

WIDSETH
ARCHITECTS ▪ ENGINEERS ▪ SCIENTISTS ▪ SURVEYORS

DRAWN BY: <XXX>
CHECKED BY: <XXX>

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

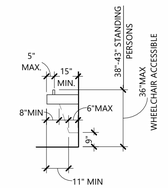
520

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

CODE INFO - DOOR CLEARANCE, ACCESS. ROUTES

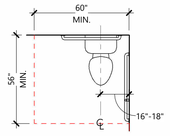
G2.10

PROJECT #: 2025-10872



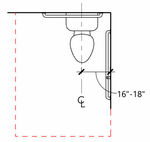
DRINKING FOUNTAIN

(SECT 602.2 & 602.5)

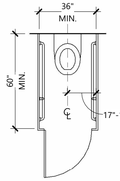


LOCATION AND SIZE OF CLEARANCE FOR WATER CLOSETS (NON-MINNESOTA)

*VERIFY WITH LOCAL REQUIREMENTS

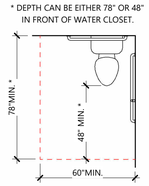


LOCATION OF WATER CLOSETS (MINNESOTA)



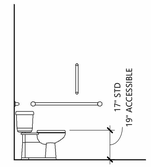
AMBULATORY ACCESSIBLE TOILET COMPARTMENT

(SECT 604.2)



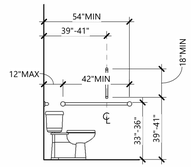
LOCATION AND SIZE OF CLEARANCE FOR WATER CLOSETS (MINNESOTA)

(SECT 604.3)



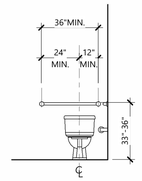
WATER CLOSET SEAT HEIGHT

(SECT 604.4)



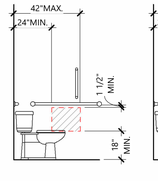
SIDE WALL GRAB BARS FOR WATER CLOSET

(SECT 604.5.1)

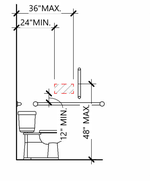


REAR WALL GRAB BAR FOR WATER CLOSET

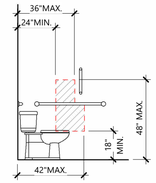
(SECT 604.5.2)



PROTRUDING DISPENSER BELOW GRAB BAR



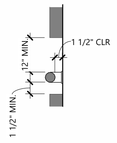
PROTRUDING DISPENSER ABOVE GRAB BAR



RECESSED DISPENSER

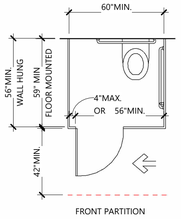
DISPENSER OUTLET LOCATION

(SECT 604.7)



SPACING OF GRAB BARS

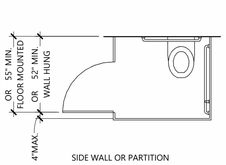
(SECT 609.3)



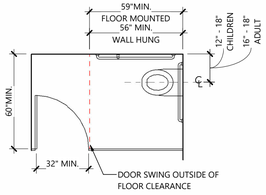
FRONT PARTITION

WHEELCHAIR ACCESSIBLE COMPARTMENT DOOR OPENING

(SECT 604.9.3.1)

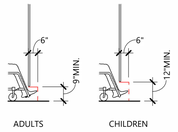


SIDE WALL OR PARTITION



WHEELCHAIR ACCESSIBLE COMPARTMENT DOOR OPENINGS ALTERNATE

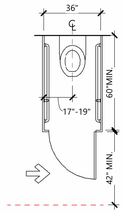
(SECT 604.9.3.1 (C))



ADULTS CHILDREN

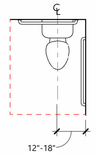
WHEELCHAIR ACCESSIBLE COMPARTMENT TOE CLEARANCE

(SECT 604.9.5)



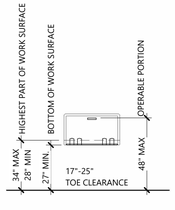
AMBULATORY ACCESSIBLE TOILET COMPARTMENT

(SECT 604.10)



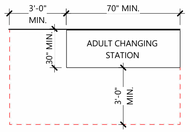
CHILDREN'S WATER CLOSET LOCATION

(SECT 604.11.2)



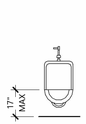
BABY CHANGING STATION

(SECT 603.5)



ADULT CHANGING STATION

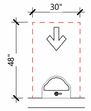
(SECT 613.1)



WALL HUNG



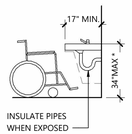
STALL TYPE



CLEAR FLOOR SPACE

TYPICAL URINAL REQUIREMENTS

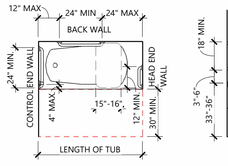
(SECT 605.2 & 605.3)

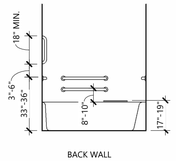


*MEASURED TO THE HIGHER OF THE RIM OR COUNTER SURFACE.

HEIGHT OF LAVATORIES AND SINKS

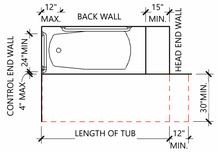
(SECT 606.3)

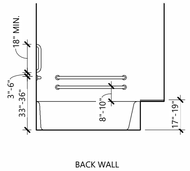




BACK WALL

BATHTUBS WITHOUT PERMANENT SEATS

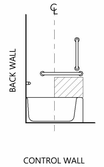




BACK WALL

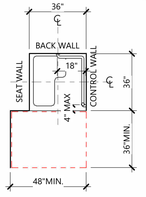
BATHTUBS WITH PERMANENT SEATS

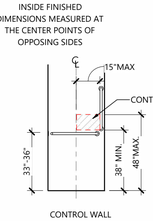
(SECT 607.2 & 607.4)



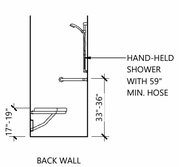
LOCATION OF BATHTUB CONTROLS

(SECT 607.5)





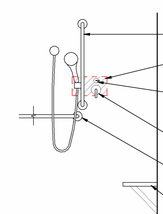
CONTROL WALL



BACK WALL

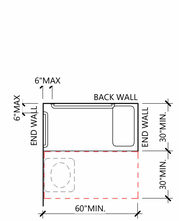
TRANSFER-TYPE SHOWER COMPARTMENT

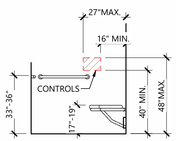
(SECT 608)



SHOWER CONTROL DETAIL

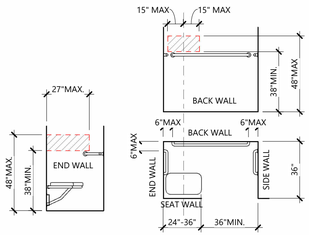
(SECT 608.4.2)





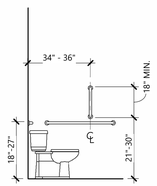
INSIDE FINISHED DIMENSIONS MEASURED AT CENTER POINTS OF OPPOSING SIDES

STANDARD ROLL-IN TYPE SHOWER COMPARTMENT



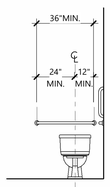
ALTERNATE ROLL-IN TYPE SHOWER COMPARTMENT

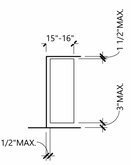
(SECT 608)



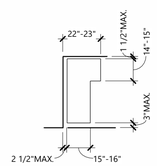
POSITION OF CHILDREN'S GRAB BARS

(SECT 609.4.2)



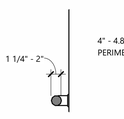


RECTANGULAR SHOWER COMPARTMENT SEAT

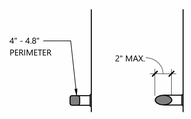


L-SHAPED SHOWER COMPARTMENT SEAT

(SECT 610.3.1 & 610.3.2)



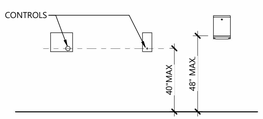
CIRCULAR



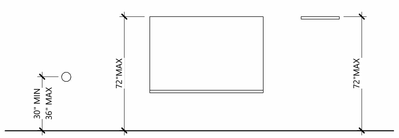
NON-CIRCULAR

GRAB BAR CROSS SECTION

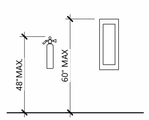
(SECT 609.2)



ELECTRIC HAND DRYER WALL MOUNTED SOAP DISPENSER PAPER TOWEL DISPENSER

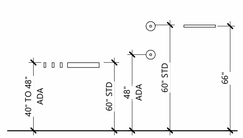


AUTOMATIC DOOR PUSHBUTTONS MARKER & TACK BOARDS TACK STRIP



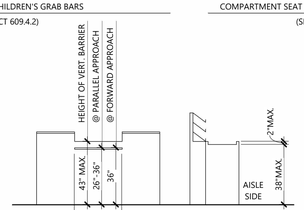
BRACKET MOUNTED FIRE EXTINGUISHER RECESSED FIRE EXTINGUISHER CABINET

FIRE EXTINGUISHERS



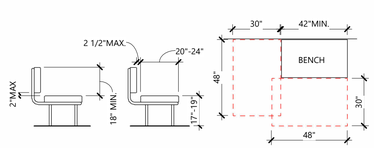
COAT/ ROBE HOOK MOP CLIP STRIP

HOOKS/SHELF



HEIGHT OF CHECKOUT COUNTERS

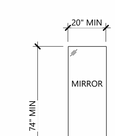
(SECT 904.4.2)



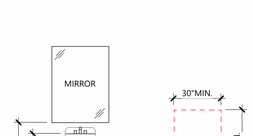
BENCH BACK SUPPORT AND SEAT HEIGHT BENCH SIZE AND OPTIONS FOR CLEAR FLOOR SPACE

BENCHES

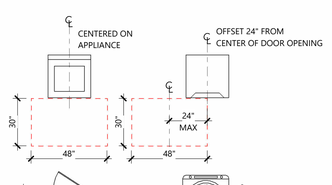
(SECT 903)



TYPICAL ACCESSIBLE MIRROR REQUIREMENTS



TYPICAL ACCESSIBLE LAVATORY REQUIREMENTS FORWARD APPROACH



LAUNDRY EQUIPMENT CLEAR FLOOR SPACE

(SECT 611.2 & 611.4)

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2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

WIDSETH
ARCHITECTS ▪ ENGINEERS ▪ SCIENTISTS ▪ SURVEYORS

DRAWN BY: <XXX>
CHECKED BY: <XXX>

APPROVAL DRAWINGS
JANUARY 9, 2026

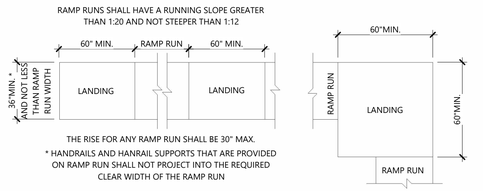
DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

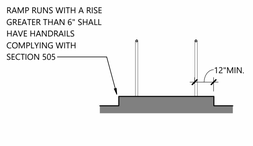
CODE INFO - TOILET ROOMS, MISC

G2.20

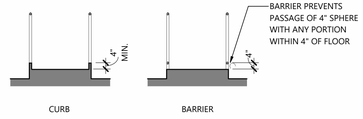
PROJECT #: 2025-10872



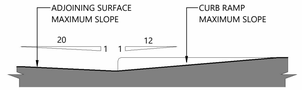
RAMP LANDINGS
(SECT 405.7)



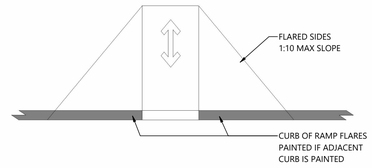
EXTENDED FLOOR SURFACE
(SECT 405.9.1)



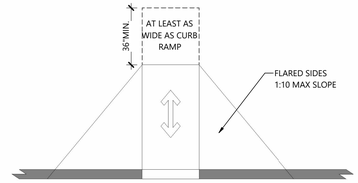
RAMP EDGE PROTECTION
(SECT 405.9.2)



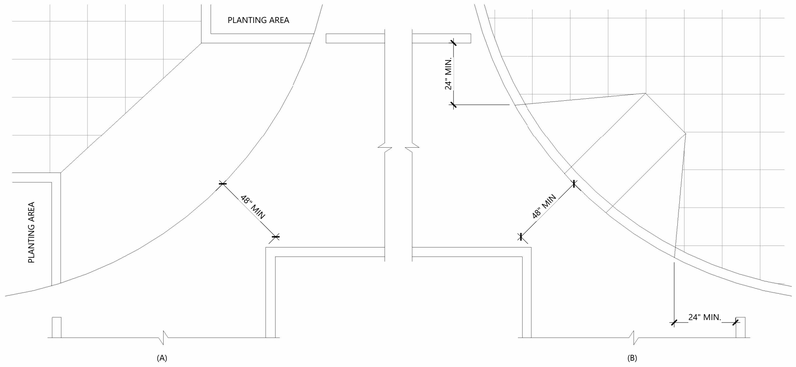
COUNTER SLOPE OF SURFACE ADJACENT TO CURB RAMPS
(SECT 406.2)



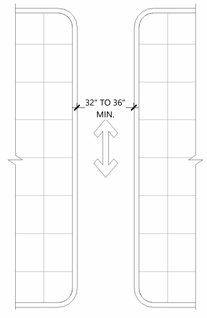
SIDES OF CURB RAMP
(SECT 406.3)



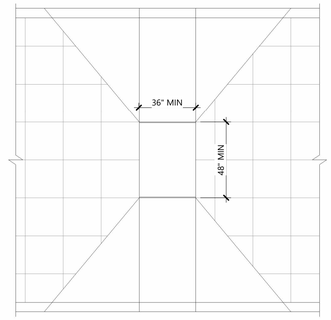
LANDINGS
(SECT 406.7)



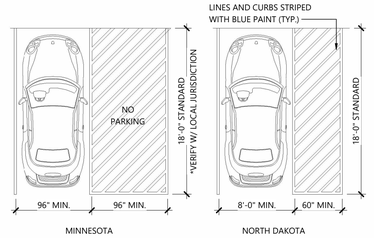
DIAGONAL CURB RAMPS
(SECT 406.10)



CUT-THROUGH AT ISLAND
(SECT 406.11)



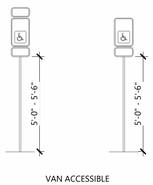
CURB RAMP AT ISLAND



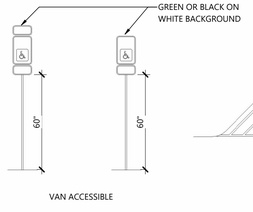
MINNESOTA | NORTH DAKOTA | NORTH DAKOTA & MINNESOTA | NORTH DAKOTA ALTERNATIVE

CAR ACCESSIBLE PARKING SPACES
(SECT 502)

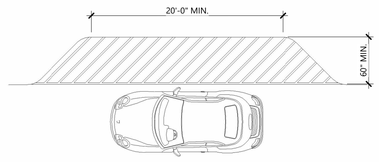
VAN ACCESSIBLE PARKING SPACES
(SECT 502)



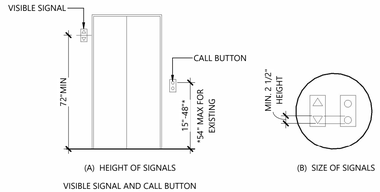
ACCESSIBLE PARKING IDENTIFICATION (MINNESOTA)
(SECT 502.4.4)



ACCESSIBLE PARKING IDENTIFICATION (NORTH DAKOTA)

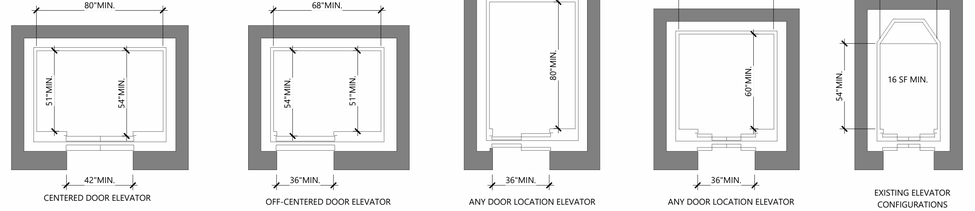


PASSENGER LOADING ACCESS AISLE
(SECT 503.3)

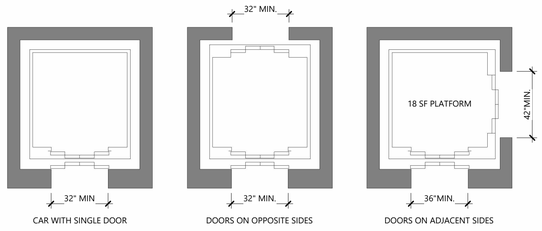


VISIBLE SIGNAL AND CALL BUTTON

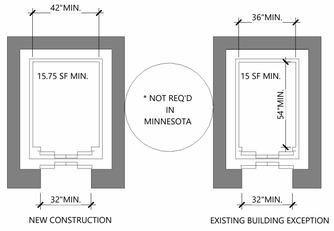
ELEVATORS
(SECT 407.2.1.1 & 407.2.2.2)



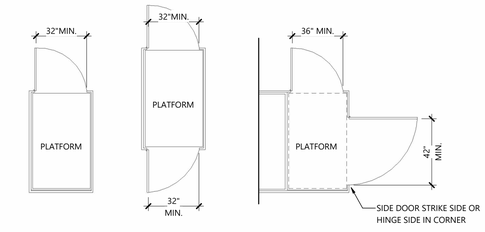
INSIDE DIMENSIONS OF ELEVATOR CARS
(SECT 407.4.1)



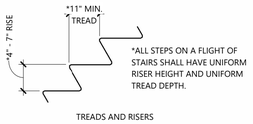
DOOR LOCATIONS FOR LIMITED USE/LIMITED APPLICATION (LULA) ELEVATORS
(SECT 408.3)



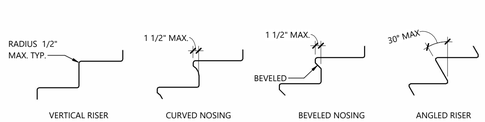
INSIDE DIMENSIONS OF LIMITED USE / LIMITED APPLICATION (LULA) ELEVATOR CARS
(SECT 408.4.1)



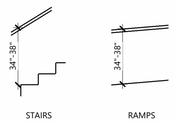
PLATFORM LIFT DOORS AND GATES
(SECT 410.2.1)



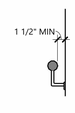
TREADS AND RISERS FOR ACCESSIBLE STAIRWAYS
(SECT 504.2)



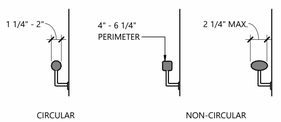
STAIR NOSING
(SECT 504.5)



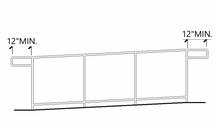
HANDRAIL HEIGHT
(SECT 505.4)



HANDRAIL CLEARANCE
(SECT 505.5)



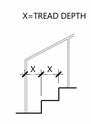
HANDRAIL CROSS SECTION
(SECT 505.7)



TOP AND BOTTOM HANDRAIL EXTENSIONS AT RAMPS
(SECT 505.10.1)



TOP HANDRAIL EXTENSIONS AT STAIRS
(SECT 505.10.2)



BOTTOM HANDRAIL EXTENSIONS AT STAIRS
(SECT 505.10.3)

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2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

WIDSETH
ARCHITECTS ▪ ENGINEERS ▪ SCIENTISTS ▪ SURVEYORS

DRAWN BY: <XXX>
CHECKED BY: <XXX>

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

CODE INFO - STAIRS, RAMPS, ELEVATORS, SITE

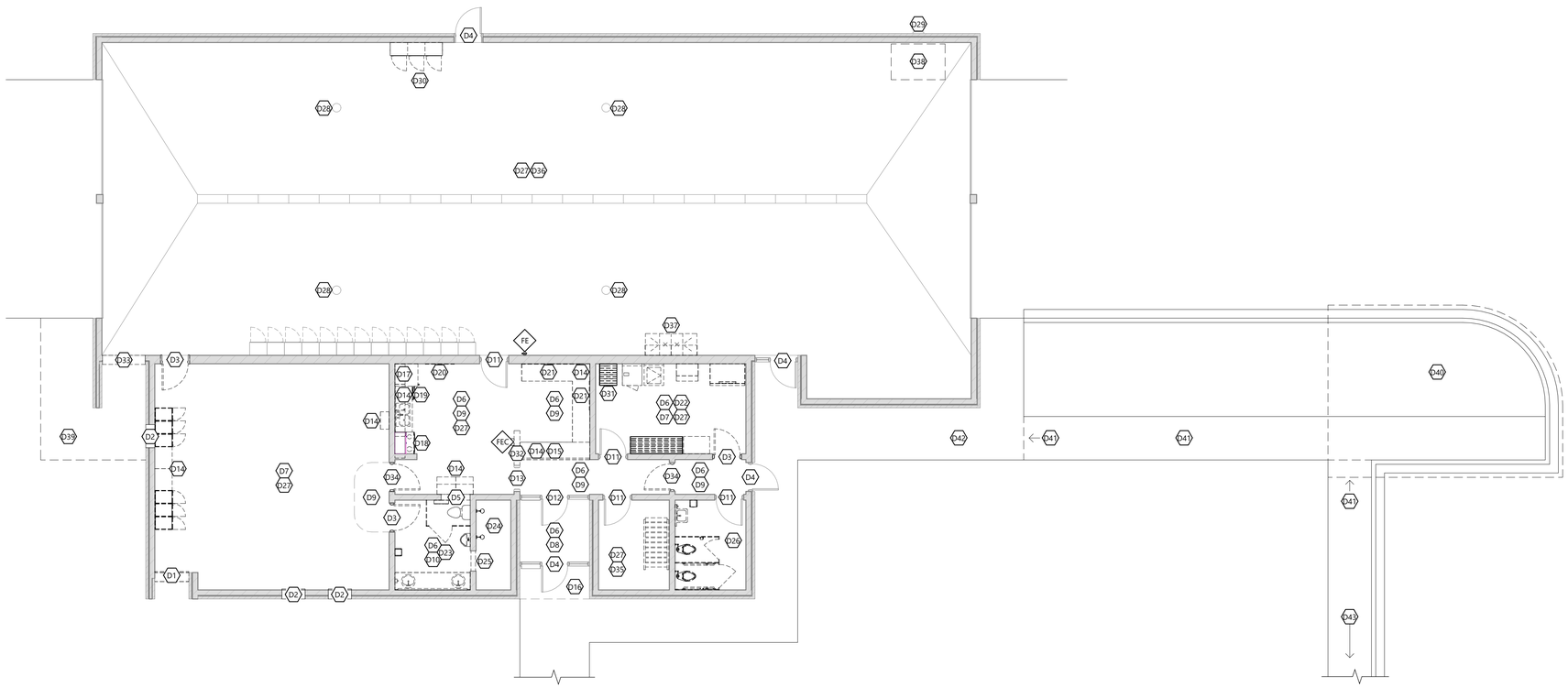
G2.30

PROJECT #: 2025-10872

(#)	KEYED DEMO PLAN NOTES
D#	DESCRIPTION
D1	REMOVE EXISTING ALUMINUM CLAD WOOD WINDOWS AND CASINGS. PREP OPENING FOR NEW WINDOW.
D2	SAWCUT OPENING FOR NEW WINDOW. SEE FLOOR PLAN FOR LOCATION. COORDINATE SAWCUT WITH MORTAR JOINT LOCATIONS. SEE STRUCTURAL FOR SUPPORT INFORMATION.
D3	EXISTING HOLLOW METAL DOOR AND FRAME TO BE REMOVED.
D4	EXISTING HOLLOW METAL DOOR AND FRAME TO BE REMOVED. PREP FOR NEW DOOR
D5	SAWCUT OPENING FOR NEW DOOR. SEE FLOOR PLAN FOR LOCATION. COORDINATE SAWCUT WITH MORTAR JOINT LOCATIONS. SEE STRUCTURAL FOR SUPPORT INFORMATION.
D6	EXISTING ACOUSTICAL CEILING TILE AND GRID TO BE REMOVED.
D7	EXISTING CARPET AND RESILIENT BASE TO BE REMOVED. PREP SURFACES FOR NEW FINISHES.
D8	EXISTING CARPET TO BE REMOVED. PREP SURFACES FOR NEW FINISHES.
D9	EXISTING VCT AND RESILIENT BASE TO BE REMOVED. PREP SURFACES FOR NEW FINISHES.
D10	EXISTING PORCELAIN TILE AND BASE TO BE REMOVED.
D11	EXISTING LOCKSET TO BE REMOVED AND PREPPED FOR NEW. PREP HOLLOW METAL DOOR AND FRAME FOR NEW PAINT.
D12	PREP HOLLOW METAL DOOR AND FRAME FOR NEW PAINT.
D13	PREP HOLLOW METAL FRAME FOR NEW PAINT.
D14	EXISTING CASEWORK TO BE REMOVED. PATCH WALLS AS NEEDED.
D15	EXISTING GYP. BOARD SOFFIT TO BE REMOVED.
D16	PREP EXISTING METAL SOFFIT FOR NEW PAINT.
D17	REMOVE REFRIGERATOR.
D18	REMOVE STOVE.
D19	REMOVE DISHWASHER.
D20	SALVAGE TACKBOARD.
D21	SALVAGE TACK STRIP.
D22	REMOVE EQUIPMENT (WASHER, DRYER, ICE MACHINE, CHESS FREEZER, METAL CABINET, AND RACKING) TO COMPLETE FLOORING WORK. REINSTALL EQUIPMENT IN SAME LOCATION.
D23	EXISTING LAV COUNTER AND MIRROR TO BE REMOVED. EXISTING TOILET PARTITION TO BE REMOVED. EXISTING PLUMBING FIXTURES TO BE REMOVED. SALVAGE EXISTING SOAP DISPENSER, PAPER TOWEL DISPENSER, AND TOILET PAPER DISPENSER.
D24	REMOVE EXISTING SHOWER ACCESSORIES.
D25	REMOVE EXISTING STEPOVER BETWEEN SHOWER AND RESTROOM. PATCH WALL AND FLOOR TO MATCH ADJACENT.
D26	REMOVE EXISTING PLUMBING FIXTURES, TOILET PARTITIONS, GRAB BARS, TP HOLDERS, MIRRORS, AND PAPER TOWEL DISPENSERS. PATCH ALL HOLES IN WALLS.
D27	PREP WALLS FOR NEW PAINT. REMOVE WALL MOUNTED ACCESSORIES AS REQUIRED FOR PAINTING AND THEN REINSTALL.
D28	REMOVE AND INFILL EXISTING EXHAUST PORT WITH CONCRETE TO MATCH ADJACENT FLOOR.
D29	EXISITING LOUVER AND DUCT TO BE REMOVED. INFILL OPENING TO MATCH ADJACENT CMU AND BRICK.
D30	EXISITNG LOCKERS TO BE RELOCATED, SEE FLOOR PLANS.
D31	EXISTING SERVER RACK TO BE RELOCATED BY OWNER.
D32	SAWCUT AND REMOVE WALL FROM CEILING TO THE TOP OF THE CABINET. COORDINATE SAWCUT WITH MORTAR JOINT LOCATIONS. PATCH WALL TO MATCH ADJACENT.
D33	REMOVE EXISTING ALUMINUM CLAD WOOD WINDOWS AND CASINGS. PREP OPENING FOR NEW DOOR.
D34	EXISTING HOLLOW METAL DOOR AND HARDWARE TO BE REMOVED, EXISTING FRAME TO REMAIN. PREP FRAME FOR NEW PAINT.
D35	PREP FLOOR FOR NEW FLOORING.
D36	PREP CEILING FOR NEW PAINT.
D37	EXISTING SINK TO BE REMOVED, SEE MECHANICAL.
D38	EXISTING MECHANICAL EQUIPMENT TO BE REMOVED, SEE MECHANICAL DRAWINGS.
D39	REMOVE TOPSOIL AS REQUIRED FOR NEW SIDEWALK. SEE FLOOR PLANS.
D40	EXISTING SIDEWALK, CURB, GUTTER, AND TURF TO BE REMOVED TO ELIMINATE PARKING LOT PENINSULA. SEE FLOOR PLAN FOR NEW.
D41	EXISTING SIDEWALK TO BE REMOVED AND REPLACED.
D42	EXISTING SIDEWALK TO REMAIN.
D43	EXISTING SIDEWALK TO BE REMOVED AND REPLACED. LENGTH OF SIDEWALK IS APPROXIMATELY 80'.

GENERAL DEMOLITION PLAN NOTES

- VERIFY EXISTING CONDITIONS AND DIMENSIONS. COORDINATE THE EXTENT OF DEMOLITION WORK AND EXISTING WORK TO REMAIN WITH NEW FLOOR PLAN AND PROJECT SITE PRIOR TO PRICING, FABRICATION, AND INSTALLATION. NOTIFY ARCHITECTS OF ALL CONFLICTS IMMEDIATELY.
- WHERE WALLS OR PARTITIONS ARE INDICATED TO BE REMOVED, REMOVE ENTIRE WALL OR PARTITIONS AS WELL AS DUCTS, PIPING, CONDUITS, AND OTHER ELEMENTS IN OR ON THEM WHICH MAY OR MAY NOT BE SPECIFICALLY IDENTIFIED, U.N.O. COORDINATE WITH OWNER ALL EQUIPMENT TO BE SALVAGED.
- REFER TO MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR ADDITIONAL DEMOLITION NOTES.
- REPAIR/PATCH OPENINGS IN WALLS, PARTITIONS, FLOORS, AND CEILINGS THAT ARE EXISTING OR WHERE DEMOLITION OCCURS TO MATCH EXISTING ADJACENT FINISH SURFACE. MAINTAIN CODE AND FIRE RATING REQUIREMENTS.
- EXISTING FINISHES TO BE REMOVED SHALL HAVE THE ORIGINAL SUBSTRATE PREPARED TO RECEIVE NEW FINISHES.
- PROVIDE SAFE MEANS OF EGRESS THROUGH AND/OR AROUND THE BUILDING AND/OR SITE AT ALL TIMES.
- AVOID DISRUPTION TO ADJACENT FLOOR/AREAS AS MUCH AS POSSIBLE. KEEP NOISE TO A LEVEL ACCEPTABLE TO THE OWNER BY SCHEDULING EXCESSIVE NOISE TASKS WITH OWNER. ALL SAW CUTTING AND NOISE FABRICATION PRODUCING CONSTRUCTION TO BE SCHEDULED WITH OWNER AS NOT TO INTERFERE WITH DAILY ACTIVITIES. THIS MAY REQUIRE AFTER HOUR WORK.
- PROVIDE DUST CONTROL BETWEEN CONSTRUCTION AREAS AND OCCUPIED AREAS AT ALL TIMES.
- ALL SHUTDOWNS OF MECHANICAL, SPRINKLER, FIRE ALARM, AND/OR ELECTRICAL SYSTEMS SHALL BE COORDINATED WITH OWNER.
- ALL ITEMS INDICATED TO BE REMOVED FROM EXISTING WALLS (TACK BOARDS, MARKER BOARDS, BUMPER RAILS, CORNER GUARDS, MIRRORS, ETC.) SHALL BE RETURNED TO OWNER. U.N.O. PATCH WALLS AS REQUIRED FOR NEW FINISHES.
- PROVIDE FIRE EXTINGUISHERS PER CODE AT ALL TIMES THROUGHOUT CONSTRUCTION AREA.



1 DEMOLITION PLAN
1/8" = 1'-0"

GRAPHIC SCALE: 1/8"
0' 12'-0" 24'-0"
N

2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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WIDSETH
ARCHITECTS • ENGINEERS • SCIENTISTS • SURVEYORS

DRAWN BY: MATAIAH TURNER
CHECKED BY: BRENT DAMMANN

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

DEMOLITION PLAN

AD1.10

PROJECT #: 2025-10872

CODE REVIEW DATA

1. GENERAL INFORMATION

A. PROJECT NAME: ***EGF FIRE STATION NO. 2 REMODEL***
B. PROJECT LOCATION: ***243 5TH AVE SE, EAST GRAND FORKS, MN 56721***
C. PROJECT DESCRIPTION:
a. ***THE PROJECT INVOLVES THE REMODEL OF THE EXISTING FIRE STATION. THE IMPROVEMENTS WILL PRIMARILY OCCUR IN THE LIVING QUARTERS AREA WITH THE CREATION OF FOUR SLEEPING ROOMS, AND SIGNIFICANT REMODEL TO THE LIVING ROOM, KITCHEN, AND BATHROOMS. NEW WINDOWS WILL BE ADDED TO THE SLEEPING ROOMS. THE EXISTING ROOF SYSTEM WILL BE REPLACED. HVAC, PLUMBING, AND ELECTRICAL MODIFICATIONS WILL BE INCLUDED AS PART OF THE WORK IN THE AFFECTED AREAS.***
D. GROSS BUILDING SIZE:
"SEE SCHEDULE "1D - GROSS BUILDING AREAS" BELOW

1D - GROSS BUILDING AREAS

NAME	AREA
FIRST LEVEL	5,845 SF
TOTAL SF:	5,845 SF

2. APPLICABLE CODES

A. MINNESOTA STATE BUILDING CODE	2020
B. MINNESOTA CONSERVATION CODE FOR EXISTING BUILDINGS	2020
C. MINNESOTA ENERGY CODE	2024
D. MINNESOTA ACCESSIBILITY CODE	2020
E. MINNESOTA STATE FIRE CODE	2020
F. MINNESOTA MECHANICAL AND FUEL GAS CODES	2020
G. MINNESOTA STATE PLUMBING CODE	2020
H. NATIONAL ELECTRICAL CODE	2023
I. NFPA	72

3. USE AND OCCUPANCY CLASSIFICATION (MN BC CHAPTER 3)

A. OCCUPANCY CLASSIFICATION: (302-312, 508, 509): R-3 RESIDENTIAL
S-2 PARKING GARAGE

5. GENERAL BUILDING HEIGHTS AND AREAS (IBC CHAPTER 5)

A. BUILDING HEIGHT (GROUP **R-3, S-2**)	ALLOWABLE	PROPOSED
TABLE 504.3 ALLOWABLE HEIGHT	55'	15'6"
TABLE 504.4 ALLOWABLE STORIES	3	1

B. BUILDING AREAS	ALLOWABLE	PROPOSED
S-2 NON-SEPARATED	26,000 SF	5,845 SF

6. TYPE OF CONSTRUCTION (IBC CHAPTER 6)

A. TYPE 11-B

BUILDING ELEMENT (601)	FIRE RESISTANCE
• PRIMARY STRUCTURAL FRAME	0-HR
• EXTERIOR BEARING WALLS	
<10 FEET SEPARATION DISTANCE	1-HR
≥10 FEET SEPARATION DISTANCE	0-HR
• INTERIOR BEARING WALLS	0-HR
• EXT. NON-BEARING WALLS/PARTITIONS	
<10 FEET SEPARATION DISTANCE	1-HR
≥10 FEET SEPARATION DISTANCE	0-HR
• INT. NON-BEARING WALLS/PARTITIONS	0-HR
• FLOOR CONSTR. & SECONDARY MEMBERS	0-HR
• ROOF CONSTR. & SECONDARY MEMBERS	0-HR

7. FIRE AND SMOKE PROTECTION FEATURES (IBC CHAPTER 7)

A. BUILDING ELEMENT	FIRE RESISTANCE
• FIRE BARRIERS (707)	
INCIDENTAL USES (509)	SEE SECTION 5
• FIRE PARTITIONS (708)	
SLEEPING UNIT	1 HR

8. INTERIOR FINISHES (IBC CHAPTER 8)

A. GROUP R-3, S

BUILDING ELEMENT	FINISH CLASSIFICATION
• EXIT ENCLOSURE / EXIT PASSAGEWAYS (803.13)	R-3 = C, S = B
• CORRIDORS: GROUP (803.13)	R-3 = C, S = B
• ROOMS AND ENCLOSED SPACES (803.13)	C
• FLOOR FINISHES (804.4)	II

B. INTERIOR WALL AND CEILING FINISH MATERIALS
CLASS A = 0-25 FLAME SPREAD INDEX; 0-450 SMOKE-DEVELOPED INDEX
CLASS B = 26-75 FLAME SPREAD INDEX; 0-450 SMOKE-DEVELOPED INDEX
CLASS C = 76-200 FLAME SPREAD INDEX; 0-450 SMOKE-DEVELOPED INDEX

9. FIRE PROTECTION SYSTEMS (IBC CHAPTER 9)

A. SPRINKLER SYSTEM (903) NOT REQUIRED PER IBC 903.2.8
EXCEPTION 3

B. PORTABLE FIRE EXTINGUISHERS (906)

• REQUIRED LOCATIONS (IFC 906.1, EXC.)	R AND S OCCUPANCIES
• CLASS A FIRE HAZARDS (906.3.1)	
MINIMUM SIZE:	2A
MAX AREA PER EXTINGUISHER:	1,500 SF
MAX FLOOR AREA FOR EXTINGUISHER:	11,250 SF
MAX TRAVEL DISTANCE TO EXTINGUISHER	75'

C. FIRE ALARM AND DETECTION (907)
• REQUIRED LOCATIONS (907.2): REQUIRED PER IBC 907.2.10

10. MEANS OF EGRESS (IBC CHAPTER 10)

A. CALCULATED OCCUPANT LOAD (1004)
"SEE SCHEDULE "10 - OCCUPANT LOADS" BELOW

10A - OCCUPANT LOADS (1004.5)

ROOM #	ROOM NAME	AREA	OCC. LOAD FACTOR (1004.5)	# OF OCC.	COMMENTS
100	VEST	69.51 SF			
101	CORRIDOR	122.42 SF			
102	STORAGE	100.69 SF	300 SF	1	
103	RESTROOM	87 SF			
104	WASH	189.11 SF	300 SF	1	
105	KITCHEN/OFFICE	328.11 SF	200 SF	2	
106	RESTROOM	144.53 SF			
107	LIVING ROOM	296.74 SF	200 SF	2	
107.1	ADA BEDROOM	147.62 SF	200 SF	1	
107.2	BEDROOM	96.84 SF	200 SF	1	
107.3	BEDROOM	88.29 SF	200 SF	1	
107.4	BEDROOM	88.29 SF	200 SF	1	
107.5	I.T. CLO.	24.25 SF	300 SF	1	
108	APPARATUS ROOM	3,811.41 SF	200 SF	20	
Grand total				31	

B. MEANS OF EGRESS SIZING (1005.3.1)
• DOORS - SEE LIFE SAFETY PLAN FOR REQUIRED/PROVIDED.

C. EXIT / EXIT ACCESS CONFIGURATION (1007) MINIMUM 2 EXITS REQUIRED SEPARATED BY MINIMUM 1/2 DIAGONAL
EXCEPTION: MINIMUM 1/3 WHEN COMPLIANT SPRINKLER SYSTEM IS APPROVED

D. ACCESSIBLE MEANS OF EGRESS (1009)
• NUMBER OF ACCESSIBLE MEANS: AT LEAST TWO FROM EACH STORY

E. DOORS (1010)
• SIZE (1010.1.1): 32" MIN. CLEAR WIDTH / 48" MAX. DOOR LEAF
• SWING (1010.1.2): DIRECTION OF TRAVEL WHERE ≥ 50 OCCUPANTS

F. EXIT SIGNS (1013) REQUIRED

G. EXIT ACCESS TRAVEL DISTANCE (1017)
• DISTANCE (1017.2): R = 250'
S-2 = 400'

11. ACCESSIBILITY (IBC CHAPTER 11 / ANSI A117.1-2009)

A. EXEMPT SPACES (1103.2.14): EQUIPMENT SPACES

B. CONNECTED SPACES (1104.3): ANY ACCESSIBLE SPACE SHALL BE CONNECTED BY AN ACCESSIBLE ROUTE

C. LOCATION (1104.5): ACCESSBILE ROUTES SHALL BE THE SHORTEST ROUTE POSSIBLE AND
COINCIDE WITH A PRIMARY USE GENERAL CIRCULATION PATH

D. PUBLIC ENTRANCES (1105.1): AT LEAST 60% OF ALL PUBLIC ENTRANCES SHALL BE ACCESSIBLE

E. TOILET AND BATHING FACILITIES (1109.2): EACH TOILET ROOM SHALL BE ACCESSIBLE:
• ACCESSIBLE FIXTURES: ≥ 1 OF EACH FIXTURE IN EACH TOILET ROOM
• ≥ 2 TOILET COMPARTMENTS IN A ROOM: ≥ 1 SHALL BE AMBULATORY-ACCESSIBLE
• ACCESSIBLE LAVATORIES: ≥ 5% OF LAVATORIES IN A TOILET ROOM
• ≥ 6 LAVATORIES IN A TOILET ROOM: ≥ 1 SHALL HAVE EXTENDED REACH RANGES

F. SIGNAGE (1110): REQUIRED; SHALL COMPLY WITH ICC A117.1

12. PLUMBING FIXTURES COUNT* (IBC CHAPTER 29)

*BASED ON DESIGNED / PROGRAMMED OCCUPANT LOAD
(CALCULATE EACH PLUMBING FIXTURE BY CLASSIFICATION OF BUILDING AND BY FLOOR)
"SEE SCHEDULE "12 - PLUMBING FIXTURE CALCS" SCHEDULE

12 - PLUMBING FIXTURE COUNTS (2902.1) - S-2

# OF OCC.	TOILETS DIV.	TOILETS REQ'D	LAVATORIES DIV.	LAVATORIES REQ'D	DRINKING FOUNTAINS DIV.	DRINKING FOUNTAINS REQ'D	OTHER REQUIRED
20	100	0.20	100	0.20	1,000	0.02	1 service sink

12 - PLUMBING FIXTURE COUNTS (2902.1) - R-3

# OF OCC.	TOILETS DIV.	TOILETS REQ'D	LAVATORIES DIV.	LAVATORIES REQ'D	BATHTUBS / SHOWERS DIV.	BATHTUBS / SHOWERS REQ'D	DRINKING FOUNTAINS DIV.	DRINKING FOUNTAINS REQ'D	OTHER REQUIRED
10	10	1.00	10	1.00	8	1.25	100	0.10	1 service sink

13. RECYCLING

A. MINIMUM RECYCLING SPACE REQUIREMENTS (1303.1500)

13 - RECYCLING SPACE REQUIREMENTS (1303.1500)

ROOM #	ROOM NAME	AREA	RECYCLING FACTOR	RECYCLING REQUIRED	RECYCLING PROVIDED
100	VEST	69.51 SF	0.0025	0.17 SF	
101	CORRIDOR	122.42 SF	0.0025	0.31 SF	
102	STORAGE	100.69 SF	0.0025	0.25 SF	9 SF
103	RESTROOM	87 SF	0.0025	0.22 SF	
104	WASH	189.11 SF	0.0025	0.47 SF	
105	KITCHEN/OFFICE	328.11 SF	0.0025	0.82 SF	
106	RESTROOM	144.53 SF	0.0025	0.36 SF	
107	LIVING ROOM	296.74 SF	0.0025	0.74 SF	
107.1	ADA BEDROOM	147.62 SF	0.0025	0.37 SF	
107.2	BEDROOM	96.84 SF	0.0025	0.24 SF	
107.3	BEDROOM	88.29 SF	0.0025	0.22 SF	
107.4	BEDROOM	88.29 SF	0.0025	0.22 SF	
107.5	I.T. CLO.	24.25 SF	0.001	0.02 SF	
108	APPARATUS ROOM	3,811.41 SF	0.001	3.81 SF	
				8.23 SF	9 SF

CODE REVIEW KEY

B / IIB	BUILDING CODE OCCUPANCY TYPE / BUILDING CODE CONSTRUCTION TYPE
EXIT DOOR # ## OCC A:## R:##"	ACTUAL EXIT OR STAIR WIDTH REQUIRED WIDTH FOR # OF OCCUPANTS / NUMBER OF OCCUPANTS
	MAX. EXIT TRAVEL DISTANCE = XX'-XX"
	MAX. COMMON PATH OF EGRESS = XX'-XX" (WHERE REQUIRED)
1P* 2P* 1E* 2E* *SEE PLAN FOR ACTUAL RATINGS	FIRE/SMOKE RESISTIVE PARTITION; RATED CMU WALL; EXISTING FIRE/SMOKE RESISTIVE PARTITION / CMU WALL
## OCC.	OCCUPANCY CALCULATION

REQUIRED ASSEMBLY RATING		MINIMUM OPENING PROTECTION ASSEMBLY
1	ONE HOUR RATED	20 Minute, 30 Minute, 45 Minute
2	TWO HOUR RATED	90 Minute
3	THREE HOUR RATED	3 Hour
4	FOUR HOUR RATED	3 Hour

TYPE OF ASSEMBLY

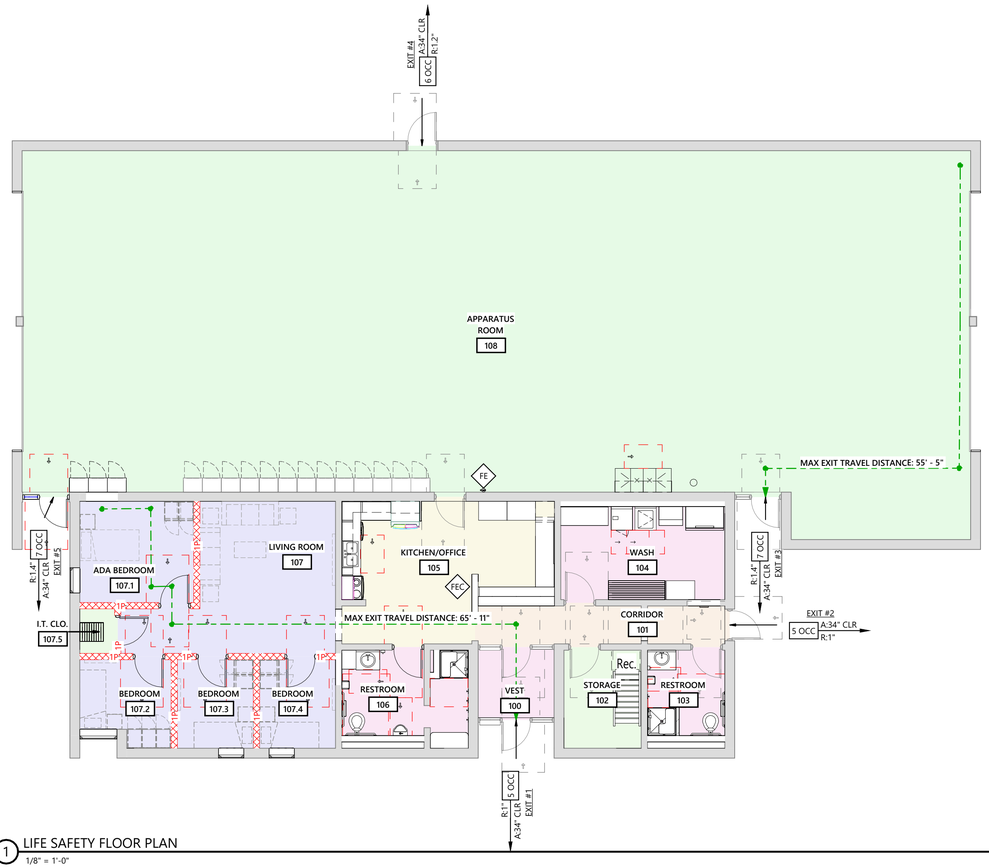
B	FIRE BARRIER	P	FIRE PARTITION
E	EXISTING AND RATED	S	SMOKE BARRIER/ COMPARTMENT
W	FIRE WALL	X	SMOKE TIGHT

FE FIRE EXTINGUISHER (MAX. TRAVEL 75')
FEC FIRE EXTINGUISHER CABINET (MAX. TRAVEL 75')
DF DRINKING FOUNTAIN
ADA ACCESSIBLE HIGH/LOW

NEW/EXISTING VERTICAL OR HORIZONTAL EXIT ENCLOSURE
NEW/EXISTING PATH/EGRESS CORRIDOR

S2
II-B

R-3
II-B



1 LIFE SAFETY FLOOR PLAN
1/8" = 1'-0"

LEGEND
A, Assembly
B, Business
F, Factory and Industrial
R-3, Residential
S, Storage
U, Utility and Miscellaneous

GRAPHIC SCALE: 1/8"
0' 12'-0" 24'-0"
N

2025-10872
EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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DRAWN BY: MATAIAH TURNER
CHECKED BY: BRENT DAMMANN

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL
LIFE SAFETY

LS1.10
PROJECT #: 2025-10872

S24

ROOM FINISH SCHEDULE

ROOM #	ROOM NAME	FLOOR FINISH	BASE MATERIAL	WALLS NORTH MATERIAL	WALLS NORTH FINISH	WALLS EAST MATERIAL	WALLS EAST FINISH	WALLS SOUTH MATERIAL	WALLS SOUTH FINISH	WALLS WEST MATERIAL	WALLS WEST FINISH	CEILING MATERIAL	CEILING FINISH	NOTES
100	VEST	CPT-1	-	-	-	EX BRICK.	-	-	-	EX BRICK	-	ACT	-	
101	CORRIDOR	LVT	RB	EX CMU	PT	EX CMU	PT	EX CMU	PT	EX CMU	PT	ACT	-	
102	STORAGE	LVT	RB	EX CMU	PT	EX CMU	PT	EX CMU	PT	EX CMU	PT	PC	PT	
103	RESTROOM	LVT	RB	EX CMU	PT*	EX CMU	PT*	EX CMU	PT*	EX CMU	PT*	ACT	-	* EPOXY PAINT
104	WASH	LVT	RB	GYP BD	PT	EX CMU	PT	EX CMU	PT	EX CMU	PT	ACT	-	
105	KITCHEN/OFFICE	LVT	RB	EX CMU	PT	EX CMU	PT	EX CMU	PT	EX CMU	PT	ACT	-	
106	RESTROOM	LVT	RB	EX CMU	PT*	EX CMU	PT*	EX CMU	PT*	EX CMU	PT*	ACT	-	* EPOXY PAINT
107	LIVING ROOM	CPT-2	RB	EX CMU	PT	EX CMU	PT	CMU	PT	CMU	PT	ACT	-	
107.1	ADA BEDROOM	CPT-2	RB	EX CMU	PT	CMU	PT	CMU	PT	EX CMU	PT	ACT	-	
107.2	BEDROOM	CPT-2	RB	CMU	PT	CMU	PT	EX CMU	PT	EX CMU	PT	ACT	-	
107.3	BEDROOM	CPT-2	RB	CMU	PT	CMU	PT	EX CMU	PT	CMU	PT	ACT	-	
107.4	BEDROOM	CPT-2	RB	CMU	PT	EX CMU	PT	EX CMU	PT	CMU	PT	ACT	-	
107.5	I.T. CLO.	CPT-2	RB	CMU	PT	CMU	PT	CMU	PT	EX CMU	PT	ACT	-	
108	APPARATUS ROOM	EX CONC	-	EX CMU	PT	EX CMU	PT	EX CMU	PT	EX CMU	PT	PC	PT	

KEYED PLAN NOTES

#	DESCRIPTION
1	RELOCATED LOCKERS TO BE WALL MOUNTED SIMILAR TO ADJACENT LOCKERS. COORDINATE PLACEMENT WITH EXISTING PIPING.
2	REINSTALL EQUIPMENT.
3	WINDOW BLIND
4	NEW SIDEWALK, MATCH EXISTING GRADES. SEE DETAIL. PROVIDE CONTROL JOINTS 5' O.C. MAX.
5	NEW CURB RAMP, SEE DETAIL.
6	EXISTING CURB AND GUTTER.
7	FINISH GRADE WITH SALVAGED TOPSOIL. MATCH EXISTING GRADES AND HYDROSEED.
8	EXISTING BITUMINUOUS PAVEMENT.
9	PROVIDE SUBGRADE TO MATCH EXISTING AND BITUMINUOUS PAVEMENT TO MATCH EXISTING PROFILE.

GENERAL FLOOR PLAN NOTES:

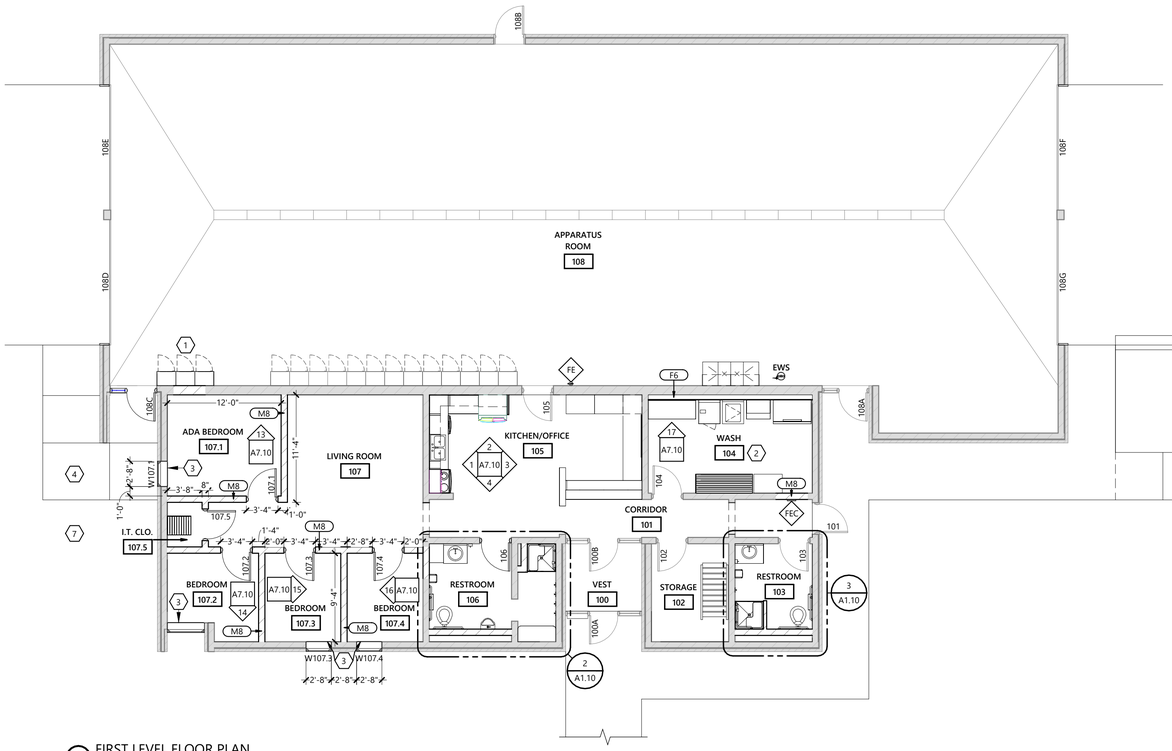
- DISCREPANCIES SHALL BE BROUGHT TO THE ARCHITECTS ATTENTION IMMEDIATELY
- ALL PIPING, CONDUITS, AND RELATED MECHANICAL AND ELECTRICAL ITEMS SHALL BE CONCEALED WITHIN DRYWALL FURRING AS REQUIRED IN FINISHED AREAS WHETHER SHOWN ON DRAWINGS OR NOT, U.N.O.
- MASONRY WALLS ARE DIMENSIONED TO THE NOMINAL FACE.
- PATCH ALL HOLES IN SURFACES WHERE EQUIPMENT HAS BEEN REMOVED OR DEMOLITION HAS OCCURRED. PREPARED SURFACES AS REQUIRED FOR NEW FINISHES. PATCH TO MATCH ADJACENT SURFACE IF NOT SCHEDULED.
- ALL FLOOR OPENINGS AND DEPRESSIONS IN THE WORK SHALL BE FILLED OR CLOSED U.N.O. WITH MATERIALS TO MATCH ADJACENT SURFACES. FINISHES ARE FIRE RATED.

ROOM FINISH SYMBOL LEGEND

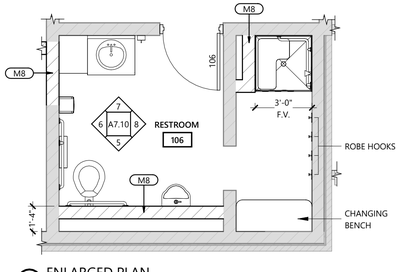
	FLOOR FINISH CHANGE SYMBOL
	DENOTES DIRECTION OF FLOORING INSTALLATION PATTERN
OR	DENOTES LOCATION OF CORNER GUARDS

ROOM FINISH NOTES

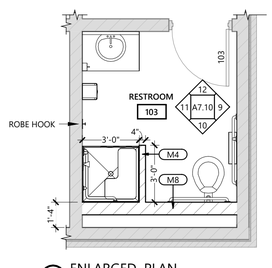
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2. <NOTE 2>



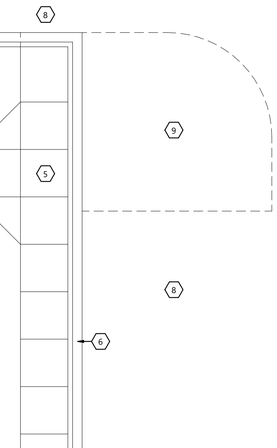
1 FIRST LEVEL FLOOR PLAN
1/8" = 1'-0"



2 ENLARGED PLAN
1/4" = 1'-0"



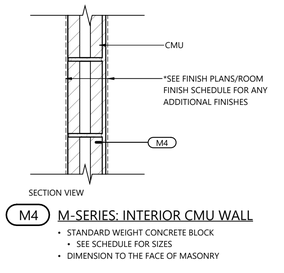
3 ENLARGED PLAN
1/4" = 1'-0"



SECTION VIEW

M8 M-SERIES: INTERIOR CMU WALL

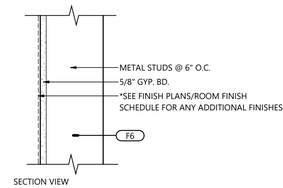
- STANDARD WEIGHT CONCRETE BLOCK
  - SEE SCHEDULE FOR SIZES
- DIMENSION TO THE FACE OF MASONRY



SECTION VIEW

M4 M-SERIES: INTERIOR CMU WALL

- STANDARD WEIGHT CONCRETE BLOCK
  - SEE SCHEDULE FOR SIZES
- DIMENSION TO THE FACE OF MASONRY



SECTION VIEW

F6 F-SERIES: INT MTL STUD FURRING WALL

- METAL STUDS @ 16" O.C. (U.N.O.)
  - SEE SCHEDULE FOR SIZES
- NON-COMBUSTIBLE
- GYPSUM BOARD ASSEMBLY, SINGLE SIDE
- DIMENSION TO THE CENTERLINE OF STUD

GRAPHIC SCALE: 1/8"
0' 12'-0" 24'-0"

N

2025-10872

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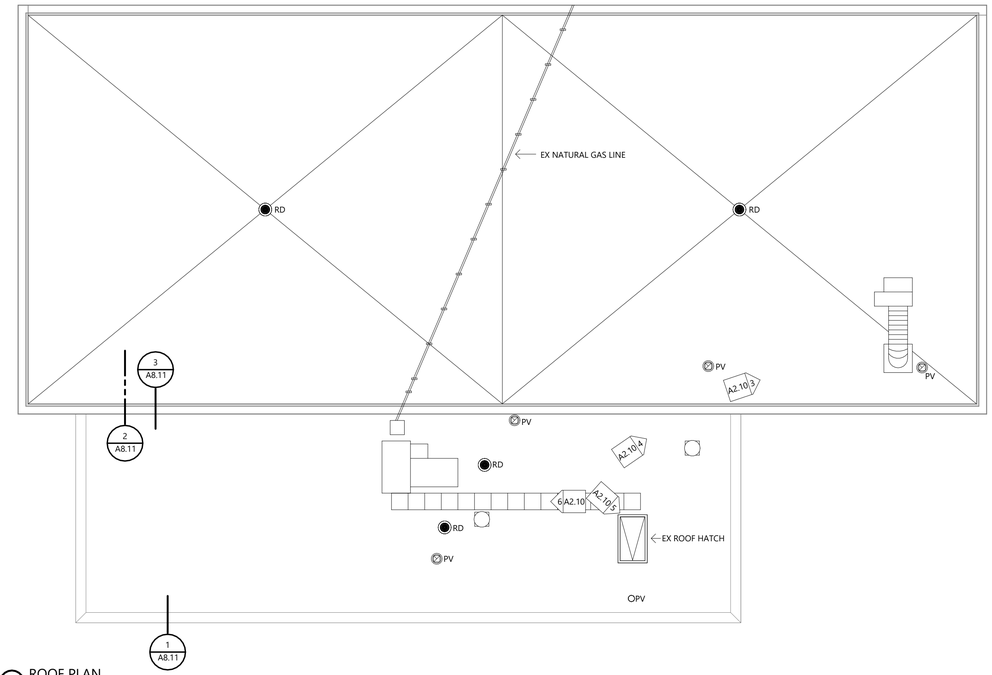
S25

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

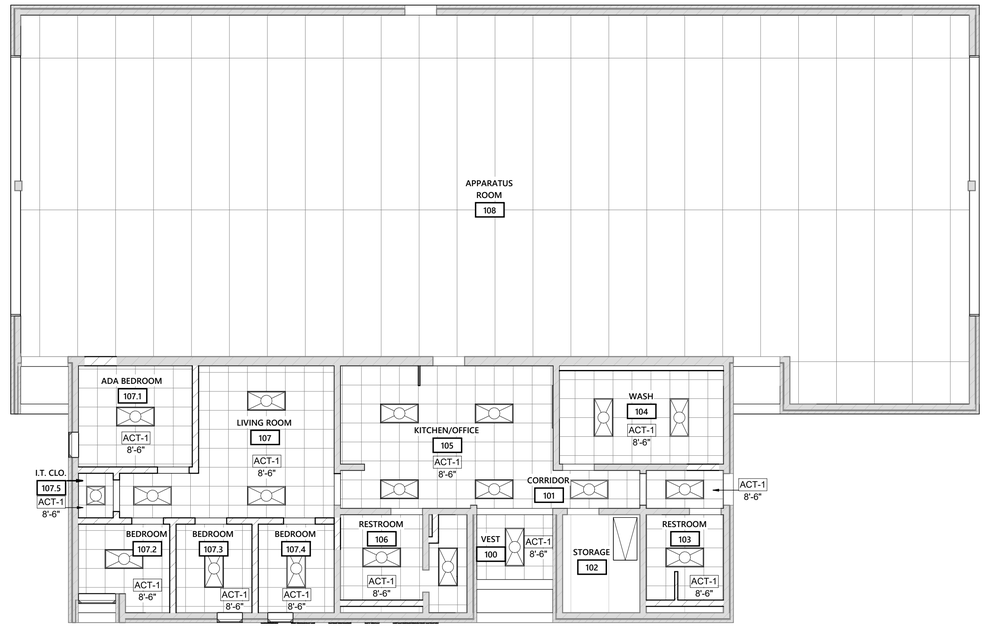
FLOOR PLAN

A1.10

PROJECT #: 2025-10872



1 ROOF PLAN
1/8" = 1'-0"



2 FIRST LEVEL REFLECTED CEILING PLAN
1/8" = 1'-0"

GENERAL ROOF PLAN NOTES:

- PROVIDE ROOFING MANUFACTURER'S RECOMMENDED STANDARDS, FLASHING DETAILS FOR ALL DRAINS, PENETRATIONS, ETC.
- VERIFY AND COORDINATE QUANTITY, SIZE AND LOCATIONS OF ROOF EQUIPMENT AND PENETRATIONS WITH OTHER TRADES.
- PROVIDE CRICKETS AT MECHANICAL EQUIPMENT CURBS ETC. TO PROVIDE POSITIVE DRAINAGE.
- UNIFORMLY SLOPE TAPERED INSULATION MINIMUM 1/4" IN HEIGHT PER 1'-0" HORIZONTALLY (OR AS REQUIRED BY CODE) AT LEVEL ROOF AREAS, UNLESS NOTED OTHERWISE.
- MINIMUM ROOF INSULATION THICKNESS AT ROOF DRAINS (LOW POINT)=2". SLOPE CRICKET INSULATION TO DRAIN AROUND PENETRATIONS (VENTS, STACKS, ETC.) AND AT VALLEYS BETWEEN ROOF DRAINS.
- ALL ROOF DRAINS SHALL HAVE AN OVERFLOW DRAIN OR SCUPPER SET AT ELEVATION 2" HIGHER THAN ROOF DRAIN, U.N.O.

ROOF PLAN LEGEND	
1/4" / 12"	TAPERED ROOF INSULATION - INCHES PER FOOT AS INDICATED
+7 3/4"	APPROXIMATE TOTAL ROOF INSULATION THICKNESS - EXCLUDING CRICKETS (MINIMUM TWO LAYER - STAGGER JOINTS)
EF	EXHAUST FANS, PLUMBING VENTS AND OTHER ROOF PENETRATIONS FOR MECHANICAL EQUIPMENT - (COORDINATE WITH HVAC DRAWINGS)
RD	ROOF DRAIN - (COORDINATE WITH MECHANICAL DRAWINGS)
ORD	SECONDARY ROOF DRAIN - (COORDINATE WITH MECHANICAL DRAWINGS)

CEILING TYPES SCHEDULE					
		TESTS & RATINGS			
CLG-##	DESCRIPTION	FIRE	STC	UL #	COMMENTS
ACT-1	24"X24" ACOUSTICAL CEILING TILE				

GENERAL CEILING PLAN NOTES:

- COORDINATE LIGHTING, SUPPLY AIR DIFFUSER & RETURN AIR GRILLE LOCATIONS WITH ELECTRICAL AND MECHANICAL DRAWINGS. VERIFY ANY DISCREPANCIES WITH ARCHITECT.
- EXIT LIGHTS NOT SHOWN - COORDINATE WITH APPROPRIATE DRAWINGS.
- SEE ROOF PLAN FOR OVERHANG DIMENSIONS
- COORDINATE ROOF ACCESS LOCATION WITH TRUSS SPACING.
- SEE ROOM FINISH SCHEDULE FOR ADDITIONAL HEIGHTS AND INFO

CEILING PLAN LEGEND			
CLG-# 8'-0"	CEILING TYPE TAG W/ CEILING HEIGHT		RECESSED CIRCULAR
	ACOUSTICAL CEILING TILE		RECESSED RECTANGULAR
	GYPSUM BOARD CEILING		SURFACE-SUSPENDED CIRCULAR
	BOLLARD		SURFACE-SUSPENDED RECTANGULAR
	EMERGENCY LIGHT		RETURN GRILLE
	EXIT SIGN WITH DIRECTIONAL ARROW(S)		ROUND CEILING DIFFUSER
	PENDANT - CEILING MOUNTED		SQUARE CEILING DIFFUSER
	CEILING FAN		SUPPLY GRILLE



3 ROOF COMPONENT



4 ROOF COMPONENT



5 ROOF HATCH



6 ROOF COMPONENT

GRAPHIC SCALE: 1/8"
0' 12'-0" 24'-0"
N

2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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CHECKED BY: BRENT DAMMANN

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

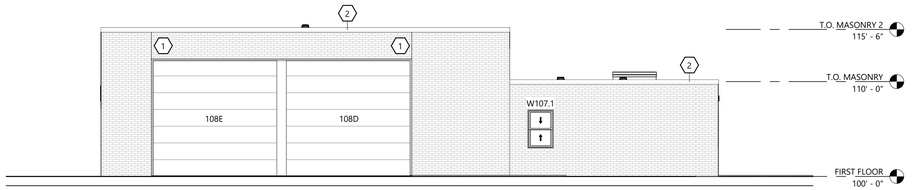
REFLECTED CEILING & ROOF PLAN

A2.10

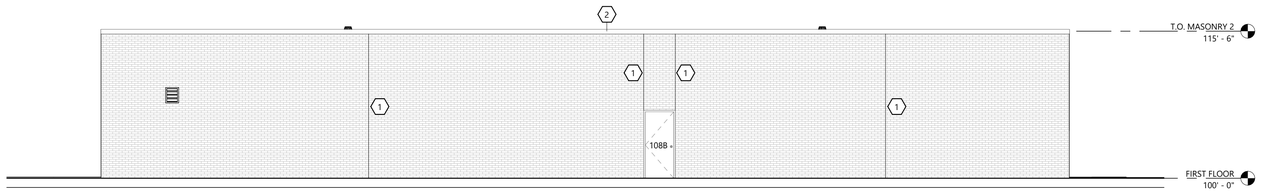
PROJECT #: 2025-10872

XXX-X	EXTERIOR MATERIAL ID LIST	
XXX-##	DESCRIPTION	COMMENTS

##	KEYED PLAN NOTES
#	DESCRIPTION
1	REMOVE EXISTING SEALANT AND BACKER AT MASONRY CONTROL JOINT. PROVIDE NEW BACKER ROD AND SEALANT.
2	NEW REFINISHED METAL WALL CAPPING.



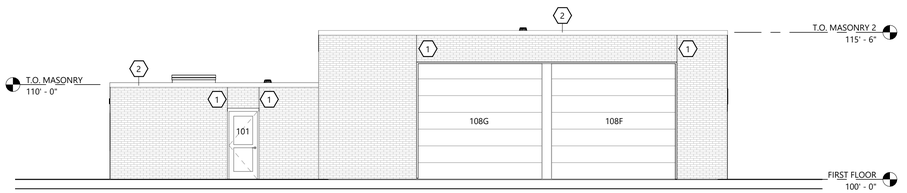
1 WEST ELEVATION
1/8" = 1'-0"



2 NORTH ELEVATION
1/8" = 1'-0"



3 SOUTH ELEVATION
1/8" = 1'-0"



4 EAST ELEVATION
1/8" = 1'-0"

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EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

BUILDING ELEVATIONS

A4.10

PROJECT #: 2025-10872

INTERIOR ELEVATION NOTES:

- ALL EXPOSED ENDS OF CASEWORK TO HAVE FINISHED END PANELS.
- WOOD DOORS, FRAMES AND BASE MOLDING TO BE FILLED, STAINED, SEALED AND SHOP FINISHED TO MATCH PROVIDED SAMPLE. WORK SHOULD BE PERFORMED IN A DUST FREE ROOM.
- PAINT ALL EXPOSED DUCTWORK, CONDUIT, ETC, TO MATCH ADJACENT SURFACES, UNLESS NOTED OTHERWISE.
- SPECIFIED PRODUCTS AND FINISHES MAY HAVE SUBSTANTIAL LEAD TIMES. CONTRACTOR SHALL BE RESPONSIBLE FOR PLACING ORDERS IN A TIMELY MANNER TO KEEP THE PROJECT ON SCHEDULE. CONTRACTOR WILL BE RESPONSIBLE FOR EXPENSES AND DESIGN FEES, RELATED TO ANY RESELECTIONS REQUIRED DUE TO FAILURE TO ORDER PRODUCTS IN A TIMELY MANNER.
- ALL FINISH WORK SHALL BE PERFORMED IN COMPLIANCE WITH SPECIFICATIONS AND DRAWINGS. SHOP DRAWING SUBMITTALS, SAMPLES AND PRODUCT DATA SHALL BE SUBMITTED TO THE ARCHITECT FOR THEIR REVIEW AND APPROVAL PRIOR TO BEGINNING WORK
- SEE "G" SHEETS FOR TYPICAL MOUNTING HEIGHTS

INTERIOR MATERIAL ID LIST

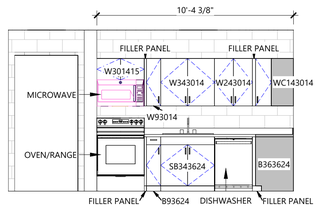
XXX-##	DESCRIPTION	MANUF.	MODEL	SIZE	COLOR/FINISH	COMMENTS

COMPONENT ID LIST

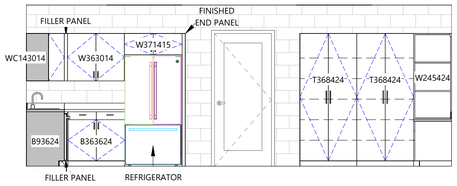
[XXX-#]	DESCRIPTION	RESPONSIBILITY		COMMENTS
		PROVIDED	INSTALLED	
				ADA HEIGHT
	3 Wide - 6 Feet High - 24 inches Deep - with Base			PROVIDED BY OTHERS
	ADA TOILET STALL GRAB BARS			SEE "G" SHEETS FOR CODE INFORMATION AND MOUNTING HEIGHTS
	AUTOMATIC PAPER TOWEL DISPENSER			SEE "G" SHEETS FOR CODE INFORMATION AND MOUNTING HEIGHTS
	BASE DOOR & DRAWER CABINET			
	BLINDS			
	COUNTERTOP			STANDARD HEIGHT
	DOUBLE DOOR & DRAWER BASE CABINET			
	DOUBLE DOOR WALL CABINET			
	DRAWER STACK			
	IN-COUNTER DOUBLE SINK			ADA COMPLIANT
	IN-COUNTER LAV, ROUND			ADA COMPLIANT
	MAP RACK			
	OPEN SHELF WALL CABINET			
	ROLL UNDER SINK UNIT			
	SINGLE COAT HOOK			SEE "G" SHEETS FOR CODE INFORMATION AND MOUNTING HEIGHTS
	SINGLE DOOR WALL CABINET			
	SINK BASE CABINET			
	SOAP DISPENSER			SEE "G" SHEETS FOR CODE INFORMATION AND MOUNTING HEIGHTS
	STANDARD SIDE BY SIDE WASHER & DRYER			
	TALL CABINET			
	TALL CABINET WITH CUBBIES			
	TOILET PAPER DISPENSER, DOUBLE ROLL, SIDE BY SIDE			SEE "G" SHEETS FOR TYPICAL MOUNTING HEIGHTS
	TRANSFER TYPE SHOWER			ADA COMPLIANT
	UNFRAMED MIRROR			SEE SPECS FOR MORE INFORMATION
	UPPER CORNER CABINET			
	UPPER FILLER CABINET			
	URINAL			ADA COMPLIANT
	WALL MOUNTED TOILET			ADA COMPLIANT

CASEWORK TAG LEGEND

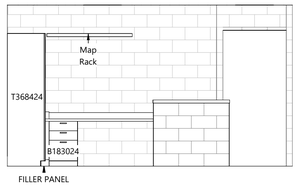
X=CABINET TYPE (IE. BASE, TALL, ETC.)
HH=HEIGHT
XWWHHDD
DD=DEPTH
WW=WIDTH



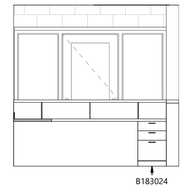
1 Elevation Kitchen - a
1/4" = 1'-0"



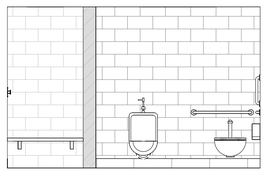
2 Elevation Kitchen - b
1/4" = 1'-0"



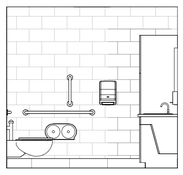
3 Elevation Reception
1/4" = 1'-0"



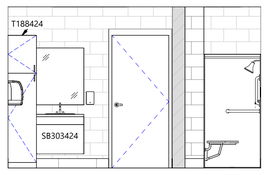
4 Elevation Front Desk Reception
1/4" = 1'-0"



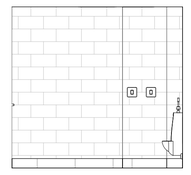
5 Restroom 1 - 106 - a
1/4" = 1'-0"



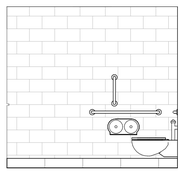
6 Restroom 1 - 106 - b
1/4" = 1'-0"



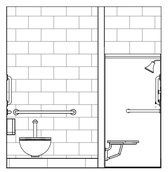
7 Restroom 1 - 106 - c
1/4" = 1'-0"



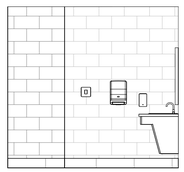
8 Restroom 1 - 106 - d
1/4" = 1'-0"



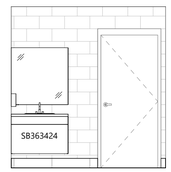
9 Restroom 2 - 103 - a
1/4" = 1'-0"



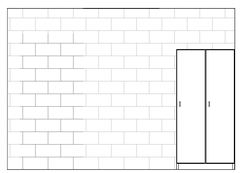
10 Restroom 2 - 103 - b
1/4" = 1'-0"



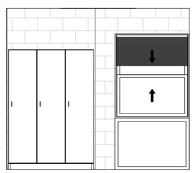
11 Restroom 2 - 103 - c
1/4" = 1'-0"



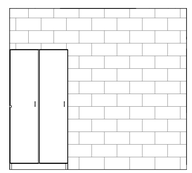
12 Restroom 2 - 103 - d
1/4" = 1'-0"



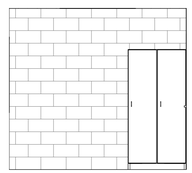
13 ADA BEDROOM - 107.1
1/4" = 1'-0"



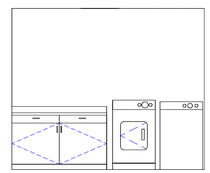
14 BEDROOM - 107.2
1/4" = 1'-0"



15 BEDROOM - 107.3
1/4" = 1'-0"



16 BEDROOM - 107.4
1/4" = 1'-0"



17 WASH CABINET - 104
1/4" = 1'-0"

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JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

528

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

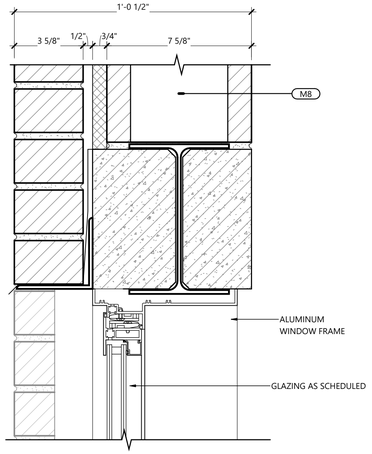
INTERIOR ELEVATIONS

A7.10

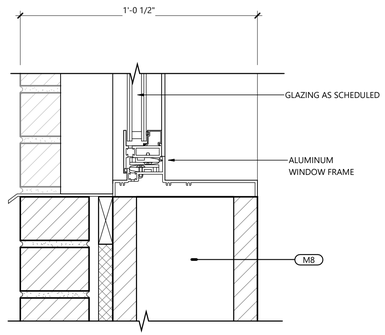
PROJECT #: 2025-10872

2025-10872

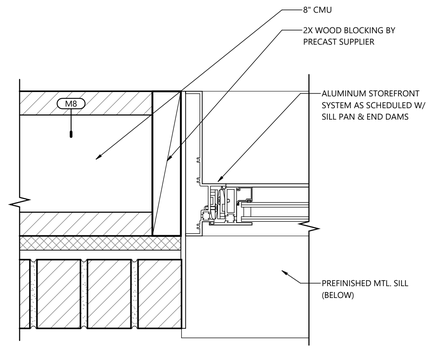
EAST GRAND FORKS FIRE STATION NO. 2 REMODEL



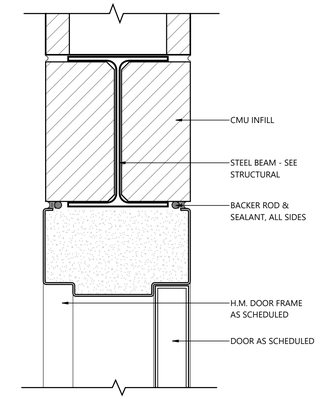
1 Window Detail - Ext - HM - CMU - 8" - Head - Steel Beam
3" = 1'-0"



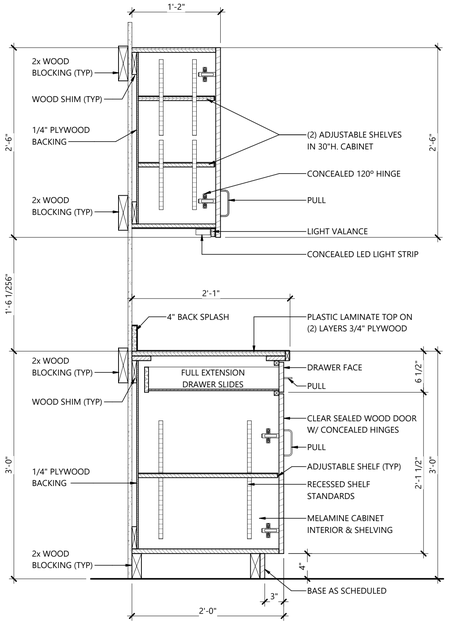
2 Window Detail - Ext - Storefront - CMU - 8" - Sill
3" = 1'-0"



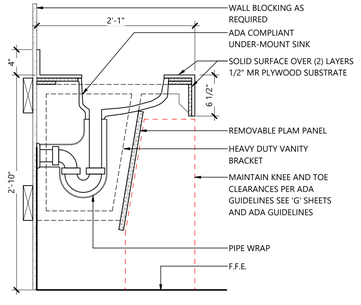
3 Window Detail - Ext - Storefront - CMU - Jamb
3" = 1'-0"



4 Door Detail - Swing - Int - HM - CMU - Beam - Head
3" = 1'-0"



5 Casework Detail - Base Upper - WD - PLam Counter - 36"x24", 30"x14" - Door Drawer
1" = 1'-0"



6 ACCESSIBLE KITCHEN/VANITY BASE DETAIL
1" = 1'-0"

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2025-10872

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JANUARY 9, 2026

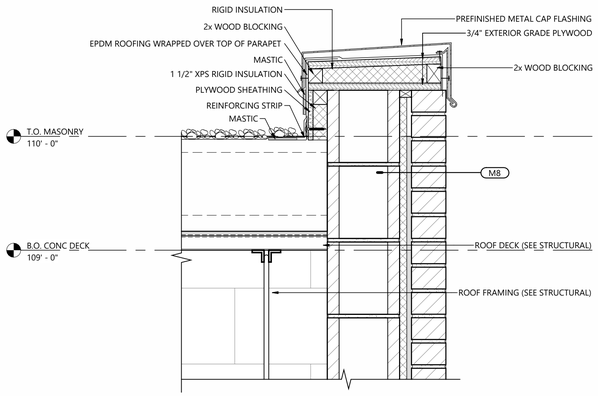
DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

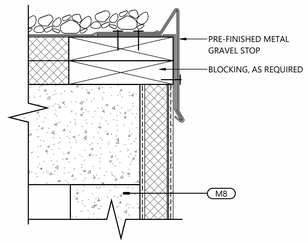
DETAILS

A8.10

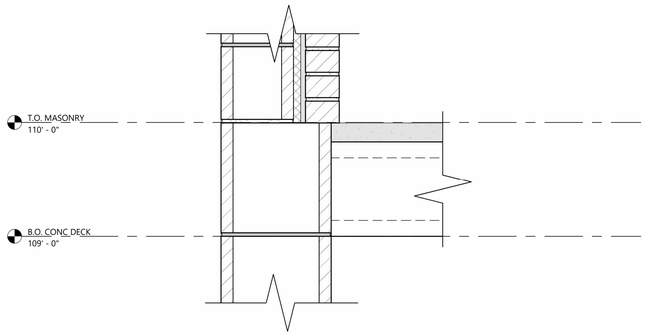
PROJECT #: 2025-10872



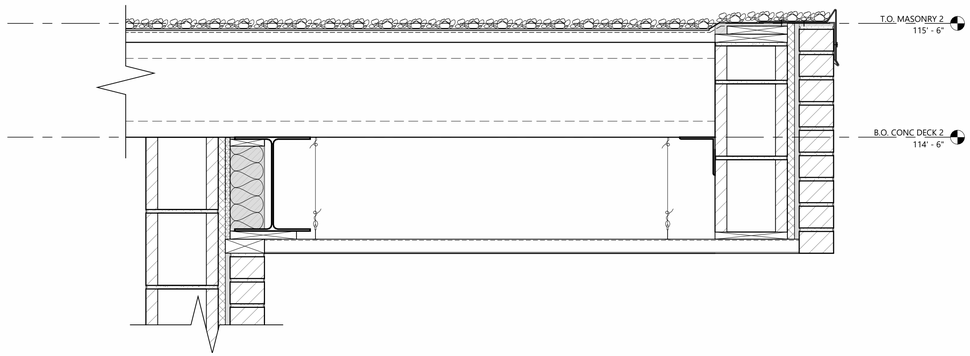
1 Low Roof
1 1/2" = 1'-0"



5 Roof Edge Detail - Conc Deck - EPDM - EIFS - Gravel Stop
3" = 1'-0"



2 Roof Detail
1 1/2" = 1'-0"



3 High Roof
1 1/2" = 1'-0"

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JANUARY 9, 2026

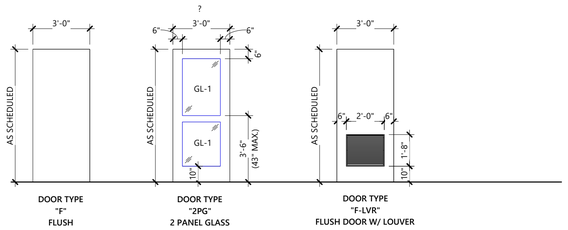
DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

ROOF DETAILS

A8.11

PROJECT #: 2025-10872

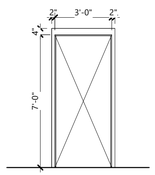


DOOR TYPE "F" FLUSH

DOOR TYPE "2PG" 2 PANEL GLASS

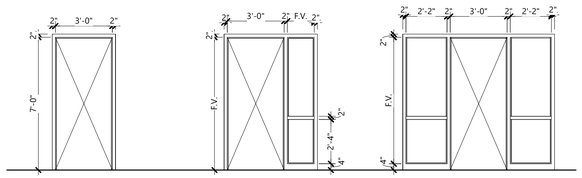
DOOR TYPE "F-LVR" FLUSH DOOR W/ LOUVER

DOOR TYPES



HM01
HOLLOW METAL
DOOR FRAME

HOLLOW METAL FRAME TYPES

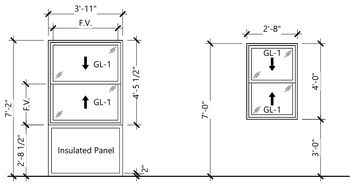


AL01
ALUMINUM
DOOR FRAME

AL02
EXTERIOR ALUMINUM
DOOR FRAME W/ SIDELITE

AL03
EXTERIOR ALUMINUM
DOOR FRAME W/ DBL SIDELITES

ALUMINUM FRAME TYPES



AL01
ALUMINUM
WINDOW FRAME

AL02
ALUMINUM
DBL HUNG WINDOW FRAME

WINDOW TYPES

DOOR SCHEDULE

###				DOOR							FRAME						
DOOR #	ROOM #	ROOM NAME	HARDWARE GROUP	WIDTH	HEIGHT	THICKNESS	TYPE	GLAZING TYPE	MATERIAL	FINISH	TYPE	MATERIAL	FINISH	HEAD HEIGHT	DEPTH	Sidelite Width	COMMENTS
100A	100	VEST	09	3' - 0"	7' - 2"	1 3/4"	2PG	GL-1	AL	PFN	AL03	AL	PFN	2"	5 3/4"	2' - 2"	
100B	100	VEST	12	3' - 0"	7' - 0"	1 3/4"	EX	EX	HM	PT	EX	HM	PT	4"	5 3/4"	2' - 2"	EXISTING DOOR AND FRAME TO BE PAINTED.
101	101	CORRIDOR	11	3' - 0"	7' - 2"	1 3/4"	2PG	GL-1	AL	PFN	AL01	AL	PFN	2"	6 1/4"		
102	102	STORAGE	03	3' - 0"	7' - 0"	1 3/4"	EX	-	HM	PT	EX	HM	PT	4"	5 3/4"		EXISTING DOOR AND FRAME TO BE PAINTED.
103	103	RESTROOM	08	3' - 0"	7' - 0"	1 3/4"	F	-	HM	PT	HM01	HM	PT	4"	5 3/4"		
104	104	WASH	03	3' - 0"	7' - 0"	1 3/4"	EX	-	HM	PT	EX	HM	PT	4"	5 3/4"		EXISTING DOOR AND FRAME TO BE PAINTED.
105	105	KITCHEN/OFFICE	02	3' - 0"	7' - 0"	1 3/4"	EX	EX	HM	PT	EX	HM	PT	4"	5 3/4"		EXISTING DOOR AND FRAME TO BE PAINTED.
106	106	RESTROOM	05	3' - 0"	7' - 0"	1 3/4"	F	-	HM	PT	HM01	HM	PT	4"	5 3/4"		
107.1	107.1	ADA BEDROOM	07	3' - 0"	7' - 0"	1 3/4"	F	-	WD	PFN	HM01	HM	PT	4"	5 3/4"		
107.2	107.2	BEDROOM	06	3' - 0"	7' - 0"	1 3/4"	F	-	WD	PFN	HM01	HM	PT	4"	5 3/4"		
107.3	107.3	BEDROOM	06	3' - 0"	7' - 0"	1 3/4"	F	-	WD	PFN	HM01	HM	PT	4"	5 3/4"		
107.4	107.4	BEDROOM	06	3' - 0"	7' - 0"	1 3/4"	F	-	WD	PFN	HM01	HM	PT	4"	5 3/4"		
107.5	107.5	I.T. CLO.	01	3' - 0"	7' - 0"	1 3/4"	F-LVR	-	WD	PFN	HM01	HM	PT	4"	5 3/4"		
108A	108	APPARATUS ROOM	11	3' - 0"	7' - 0"	1 3/4"	2PG	GL-1	AL	PFN	AL02	AL	PFN	2"	5 3/4"	1' - 5"	
108B	108	APPARATUS ROOM	04	3' - 0"	7' - 0"	1 3/4"	F	-	HM	PT	HM01	HM	PT	4"	12 3/4"		
108C	108	APPARATUS ROOM	11	3' - 0"	7' - 0"	1 3/4"	2PG	GL-1	AL	PFN	AL02	AL	PFN	2"	5 3/4"	1' - 5"	
108D	108	APPARATUS ROOM	10	13' - 2 5/8"	12' - 4 3/8"	1 1/2"		-		-			-				Existing
108E	108	APPARATUS ROOM	10	13' - 2 5/8"	12' - 4 3/8"	1 1/2"		-		-			-				Existing
108F	108	APPARATUS ROOM	10	13' - 2 5/8"	12' - 4 3/8"	1 1/2"		-		-			-				Existing
108G	108	APPARATUS ROOM	10	13' - 2 5/8"	12' - 4 3/8"	1 1/2"		-		-			-				Existing

2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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WIDSETH
ARCHITECTS ▪ ENGINEERS ▪ SCIENTISTS ▪ SURVEYORS

DRAWN BY: MATAIAH TURNER
CHECKED BY: BRENT DAMMANN

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

S31

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

DOOR AND FRAME TYPES AND SCHEDULES

A9.10

PROJECT #: 2025-10872

GENERAL PLUMBING NOTES

THE FOLLOWING NOTES APPLY TO ALL MECHANICAL SHEETS:

1. ALL EQUIPMENT SHALL BE UL TESTED AND BEAR UL STAMP.
2. ROUTE ALL PLUMBING PIPING PARALLEL TO BUILDING LINES UNLESS OTHERWISE NOTED.
3. ALL PLUMBING PIPING SHALL BE CONCEALED ABOVE SUSPENDED CEILINGS AND IN MECHANICAL CHASES UNLESS NOTED OR INDICATED OTHERWISE. PLUMBING PIPING SHALL BE EXPOSED IN ROOMS WITHOUT CEILINGS.
4. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR SLEEVES AND/OR OPENINGS REQUIRED TO INSTALL PLUMBING PIPES THROUGH FOUNDATIONS, FLOOR SLAPS, WALLS, BEAMS AND ROOF.
5. CEILING ACCESS SHALL BE PROVIDED AT ALL VALVES, WHERE ACCESS IS REQUIRED TO SPACE ABOVE INACCESSIBLE CEILINGS, CEILING ACCESS DOORS (VERIFY RATING WITH ARCHITECTS PLANS) SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR UNLESS NOTED OTHERWISE.
6. COORDINATE WITH OTHER TRADES TO PREVENT CONFLICTS WITH THE INSTALLATION OF MECHANICAL WORK. PROVIDE ADEQUATE SPACE FOR EQUIPMENT SERVICING AND COMPONENT REPLACEMENT.
7. DOMESTIC PIPING, DRAIN PIPING AND PLUMBING PIPING SHALL BE COORDINATED WITH OTHER TRADES BEFORE BEING INSTALLED. ALL EQUIPMENT SHALL BE INSTALLED WITH ACCORDANCE WITH ARCHITECTURAL REFLECTED CEILING PLANS. FAILURE TO COORDINATE WORK WILL BE REDONE AT THE EXPENSE OF THE CONTRACTOR.
8. SEAL ALL SPACE AROUND PLUMBING PIPING PENETRATIONS OF WALLS AND FLOORS WITH FIRESTOPPING MATERIAL. ALSO SEAL ALL EXTERIOR WALL AND ROOF PENETRATIONS WATERTIGHT.
9. ALL MOTORS SHALL BE MOUNTED SO THAT THE NAMEPLATE CAN BE READ WITHOUT REMOVING THE MOTOR FROM ITS MOUNTING.
10. PROVIDE HOUSEKEEPING PADS BELOW FLOOR MOUNTED EQUIPMENT. PADS ARE TO BE REINFORCED CONCRETE 4" THICK AND 3" BEYOND UNIT EDGES IN ALL DIRECTIONS.
11. PROVIDE SLEEVES WHERE NEEDED FOR PLUMBING WORK. COORDINATE LOCATION OF SLEEVES AND HOLD OUTS REQUIRED WITH THE GENERAL CONTRACTOR PRIOR TO SETTING OF FORMS, WALLS AND OTHER STRUCTURAL MEMBERS.
12. PROVIDE OFFSETS AND TRANSITIONS AS MAY BE REQUIRED TO INSTALL PLUMBING PIPING.
13. CUTTING, DEMOLITION, AND PATCHING OF WALLS, FLOOR, AND REMOVAL AND REPLACEMENT OF CEILINGS, REQUIRED TO INSTALL PLUMBING PIPING, ARE TO BE COORDINATED BY, AND PAID FOR BY THE MECHANICAL CONTRACTOR.
14. THIS CONTRACTOR SHALL PROVIDE COMPLETE FIRE CAULKING FOR ALL WALL FLOOR AND CEILING PENETRATIONS. THIS INCLUDES ALL PLUMBING PIPING, CONTROL WIRING AND CONDUIT, NECESSITATED BY HIS WORK.
15. AFTER FLUSHING THE DOMESTIC WATER PIPING, THE PIPING SHALL BE FILLED WITH A WATER/CHLORINE SOLUTION CONTAINING AT LEAST 200 PPM OF CHLORINE AND THE SYSTEM ALLOWED TO STAND FOR THREE HOURS.
16. DOMESTIC WATER SERVICE PIPING SHALL BE THOROUGHLY FLUSHED AND TESTED WITH 125 PSIG HYDROSTATIC TEST FOR EIGHT (8) HOURS MINIMUM, IN ACCORDANCE WITH ALL STATE, NATIONAL AND LOCAL PLUMBING CODES.
17. SANITARY SEWER AND VENT PIPING SHALL BE TESTED IN ACCORDANCE WITH NATIONAL, STATE, AND LOCAL PLUMBING CODES. ALL POINTS SHALL BE PLUGGED AND FILLED WITH WATER TO UPPERMOST OUTLET. SYSTEM SHALL STAND FULL OF WATER FOR 24 HOURS OR BE TESTED WITH A 5 PSI AIR TEST FOR 15 MINUTES WITH NO INDICATION OF LEAKS.
18. NO DOUBLE WYE DRAINAGE FITTINGS SHALL BE USED IN THE HORIZONTAL POSITION.
19. A FULL SIZE VENT STACK (3" MINIMUM) SHALL BE PROVIDED CONTINUOUS FROM ITS BASE THROUGH THE ROOF TERMINAL. THIS VENT SHALL BE THE MOST REMOTE STACK FROM THE LOCATION WHERE THE BUILDING DRAIN LEAVES THE BUILDING.
20. FIXTURE DRAIN LINES MUST CONNECT TO THE VERTICAL SANITARY DRAIN WITH A TEE CONNECTION RATHER THAN A WYE CONNECTION.
21. ABOVE GRADE HORIZONTAL RUNS OF PLASTIC WASTE AND VENT PIPE CANNOT EXCEED 35 FEET IN TOTAL LENGTH. ABOVE GRADE VERTICAL STACKS CONSTRUCTED OF PLASTIC PIPE MAY EXCEED 35 FEET IN TOTAL HEIGHT ONLY IF AN APPROVED EXPANSION JOINT IS USED.
22. SOLVENT WELD JOINTS IN PVC AND CPVC PIPE MUST INCLUDE USE OF A PRIMER WHICH IS OF CONTRASTING COLOR TO THE PIPE AND CEMENT.
23. ROUGH-IN FOR AND CONNECT HOT AND COLD WATER, WASTE AND VENT TO ALL FIXTURES AND EQUIPMENT FURNISHED BY OTHERS SUCH AS ICE MACHINES, WASHERS ETC. THIS CONTRACTOR IS RESPONSIBLE FOR VERIFYING EXACT REQUIREMENTS AND LOCATIONS AND FOR PROVIDING ALL TRAPS, TAILPIECES, VALVES AND SUPPLIES FOR EACH ITEM OF EQUIPMENT.
24. REFER TO FLOOR PLANS FOR MAIN SIZES NOT SHOWN ON HOT AND COLD WATER AND WASTE AND VENT PIPING DIAGRAMS.
25. ROOFING REPAIRS FOR THE INSTALLATION OF MECHANICAL EQUIPMENT SHALL BE BY MECHANICAL. RUBBER ROOFING SHALL BE REPAIRED BY A CERTIFIED INSTALLER SO THAT ROOFING WARRANTY IS NOT VOIDED.
26. PLUMBING SHALL BE IN STRICT ACCORDANCE TO ALL STATE AND LOCAL PLUMBING CODES. PROVIDE AND INSTALL BACKWATER VALVE IF REQUIRED BY STATE OR LOCAL CODE.
27. PLUMBING CONTRACTOR TO COORDINATE EXACT LOCATION OF TUB AND SHOWER VALVE AND HEAD LOCATIONS WITH ARCHITECTURAL PLANS PRIOR TO INSTALL.
28. THIS SET OF DRAWINGS COMPRISE THE CONTRACT DOCUMENTS FOR THIS PROJECT AND AS SUCH EACH DISCIPLINE'S DRAWING SHEETS (ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, CIVIL, AND SPECIALTY) SHALL BE REFERRED TO AND COORDINATED WITH EACH OTHER. IF CONFLICTS ARE NOTED BETWEEN THE DISCIPLINES, THEY ARE TO BE BROUGHT TO THE ARCHITECT OF RECORD'S ATTENTION TO BE RESOLVED. IT IS ESPECIALLY IMPORTANT TO REFERENCE AND COORDINATE WITH THE ARCHITECTURAL DRAWINGS.

GENERAL HVAC NOTES

THE FOLLOWING NOTES APPLY TO ALL MECHANICAL SHEETS:

1. ALL EQUIPMENT SHALL BE UL TESTED AND BEAR UL STAMP.
2. ROUTE ALL HVAC PIPING PARALLEL TO BUILDING LINES UNLESS OTHERWISE NOTED.
3. ALL HEATING PIPING, COOLING PIPING AND DUCTWORK SHALL BE CONCEALED ABOVE SUSPENDED CEILINGS AND IN MECHANICAL CHASES UNLESS NOTED OR INDICATED OTHERWISE. PIPING AND DUCTWORK SHALL BE EXPOSED IN ROOMS WITHOUT CEILINGS.
4. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR SLEEVES AND/OR OPENINGS REQUIRED TO INSTALL PIPES AND DUCTS THROUGH FOUNDATIONS, FLOOR SLABS, WALLS, BEAMS AND ROOF.
5. CEILING ACCESS SHALL BE PROVIDED AT ALL VALVES, FIRE DAMPERS, SMOKE DAMPERS, FIRE/SMOKE DAMPERS, MANUAL AND MOTORIZED DAMPERS, AND OTHER ITEMS REQUIRING SERVICE OR INSPECTION. WHERE ACCESS IS REQUIRED TO SPACE ABOVE INACCESSIBLE CEILINGS, CEILING ACCESS DOORS SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR UNLESS NOTED OTHERWISE.
6. COORDINATE WITH OTHER TRADES TO PREVENT CONFLICTS WITH THE INSTALLATION OF MECHANICAL WORK. PROVIDE ADEQUATE SPACE FOR EQUIPMENT SERVICING AND COMPONENT REPLACEMENT.
7. DIFFUSERS, REGISTERS, GRILLES, DRAIN PIPING, HEATING PIPING, AND FANS SHALL BE COORDINATED WITH OTHER TRADES BEFORE BEING INSTALLED. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH ARCHITECTURAL REFLECTED CEILING PLANS. FAILURE TO COORDINATE WORK WILL BE REDONE AT THE EXPENSE OF THE CONTRACT.
8. SEAL ALL SPACE AROUND PIPING, WIRING AND DUCTWORK PENETRATIONS OF WALLS AND FLOORS WITH FIRESTOPPING MATERIAL. SEAL ALL EXTERIOR WALL AND ROOF PENETRATIONS WATERTIGHT.
9. PROVIDE A WATERTIGHT DRAIN PAN THAT HAS A MINIMUM DEPTH OF 2 INCHES AT OUTSIDE AIR INTAKE CHAMBERS, RELIEF HOODS AND POWER ROOF VENTILATORS.
10. ALL EQUIPMENT SHALL BE PERMANENTLY MARKED TO CLEARLY IDENTIFY THE AREA SERVED.
11. PROVIDE HOUSEKEEPING PADS BELOW FLOOR MOUNTED EQUIPMENT. PADS ARE TO BE REINFORCED CONCRETE 4" THICK AND 3" BEYOND UNIT EDGES IN ALL DIRECTIONS.
12. PROVIDE SLEEVES WHERE NEEDED FOR MECHANICAL WORK. COORDINATE LOCATION OF SLEEVES AND HOLD OUTS REQUIRED WITH THE GENERAL CONTRACTOR PRIOR TO SETTING OF FORMS, WALLS, AND OTHER STRUCTURAL MEMBERS.
13. PROVIDE OFFSETS AND TRANSITIONS AS MAY BE REQUIRED TO INSTALL DUCTWORK AND PIPING. IF DUCTWORK HAS TO BE RECONFIGURED TO FIT WITHIN SPACE, IT SHALL BE RESIZED TO EQUAL FRICTION LOSS. INSTALL DUCTWORK AND PIPING WITHIN THE JOIST SPACE WHERE REQUIRED TO PERMIT INSTALLATION OF ALL WORK AND ALLOWANCES FOR WORK OF OTHER TRADES.
14. CUTTING, DEMOLITION AND PATCHING OF WALLS, FLOOR AND REMOVAL AND REPLACEMENT OF CEILINGS, REQUIRED TO INSTALL MECHANICAL EQUIPMENT, ARE TO BE COORDINATED BY, AND PAID FOR BY THE MECHANICAL CONTRACTOR.
15. THIS CONTRACTOR SHALL PROVIDE COMPLETE FIRE CAULKING FOR ALL WALL, FLOOR AND CEILING PENETRATIONS. THIS INCLUDES ALL COOLING, HEATING AND PROCESS PIPING, CONTROL WIRING AND CONDUIT, ALL DUCTWORK, BREECHING, AIR INTAKE PENETRATIONS ETC. NECESSITATED BY HIS WORK.
16. ALL GAS PIPING SHALL BE AIR TESTED IN ACCORDANCE WITH LOCAL CITY CODES, BUT IN NO CASE LESS THAN 25 POUND AIR TEST FOR THIRTY (30) MINUTES AT THE COMPLETION OF THE WORK. THE INSTALLATION SHALL BE IN ACCORDANCE WITH THE NATIONAL BOARD OF FIRE UNDERWRITERS AND ALL STATE AND LOCAL CODES.
17. ROOFING REPAIRS FOR THE INSTALLATION OF MECHANICAL EQUIPMENT SHALL BE BY MECHANICAL. RUBBER ROOFING SHALL BE REPAIRED BY A CERTIFIED INSTALLER SO THAT ROOFING WARRANTY IS NOT VOIDED.
18. THIS SET OF DRAWINGS COMPRISE THE CONTRACT DOCUMENTS FOR THIS PROJECT AND AS SUCH EACH DISCIPLINE'S DRAWING SHEETS (ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, CIVIL, AND SPECIALTY) SHALL BE REFERRED TO AND COORDINATED WITH EACH OTHER. IF CONFLICTS ARE NOTED BETWEEN THE DISCIPLINES THEY ARE TO BE BROUGHT TO THE ARCHITECT OF RECORD'S ATTENTION TO BE RESOLVED. IT IS ESPECIALLY IMPORTANT TO REFERENCE AND COORDINATE WITH THE ARCHITECTURAL DRAWINGS.

GENERAL MECHANICAL DEMOLITION NOTES

THE FOLLOWING NOTES APPLY TO ALL MECHANICAL SHEETS:

1. OWNER HAS FIRST POSSESSION OF ANY AND ALL MECHANICAL EQUIPMENT AND ITEMS BEING REMOVED. IF OWNER DESIRES TO KEEP FIXTURES OR ANY REMOVED ITEMS, STORE WHERE DIRECTED BY OWNER. DISPOSE PROPERLY ANY ITEMS THE OWNER DOES NOT DESIRE TO KEEP.
2. DEMOLITION DRAWINGS ARE COOPERATIVE IN NATURE. DRAWINGS WERE DEVELOPED USING RECORD DRAWINGS AND ON SITE INVESTIGATIONS. THE MECHANICAL CONTRACTOR (M.C.) IS RESPONSIBLE TO VISIT THE SITE TO VERIFY AND INVESTIGATE ALL CONDITIONS APPLICABLE FOR COMPLETION OF THE CONSTRUCTION WORK. A THOROUGH ON-SITE ANALYSIS OF EXISTING CONDITIONS PRIOR TO STARTING WORK TO ASCERTAIN THE FULL SCOPE OF THE DEMOLITION WORK IS REQUIRED.
3. THE M.C. IS TO REPORT TO THE ENGINEER IMMEDIATELY IF ANY DISCREPANCIES OR DISCOVERIES ARE MADE DURING THE DEMOLITION PROCESS THAT CONFLICT WITH THE DRAWINGS.
4. M.C. SHALL CONTACT THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES, ERRORS, OR OMISSIONS DISCOVERED IN THE DRAWINGS OR SPECIFICATIONS PRIOR TO PROCEEDING WITH THE WORK. OTHERWISE CORRECTION OF SUCH ITEMS IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. ANY WALLS, SURFACES, DOORS, FINISHES, ETC. TO REMAIN THAT ARE DAMAGED BY THE M.C. DURING CONSTRUCTION MUST BE PATCHED, REPAIRED OR REPLACED TO MATCH THE ADJACENT SURFACES.
6. M.C. TO PATCH HOLES IN WALLS AND/OR CEILINGS LEFT BY DEMOLISHED MECHANICAL EQUIPMENT AND PIPING TO MATCH ADJACENT SURFACES.
7. ALL WORK REQUIRING EXTENDED INCONVENIENCE TO THE OWNER SHALL BE COORDINATED WITH OWNER 7 DAYS PRIOR TO THE COMMENCEMENT OF WORK.
8. REMOVE ALL ABANDONED OR UNUSED PIPE AND MATERIAL FROM PROJECT AND DISPOSE OF PROPERLY.

MECHANICAL PIPING SYMBOLS

COLD WATER PIPING	PIPE UP
HOT WATER PIPING	BOTTOM PIPE TAKE-OFF
CIRCULATING HOT WATER PIPING	TOP PIPE TAKE-OFF
REVERSE OSMOSIS WATER PIPING	CAPPED PIPE
SANITARY PIPING	BALL VALVE
SANITARY VENT PIPING	GATE VALVE
CONDENSATE PIPING	CHECK VALVE
HEATING WATER SUPPLY	BACKFLOW PREVENTER
HEATING WATER RETURN	BALANCING VALVE
CHILLED WATER SUPPLY	CONCENTRIC REDUCER
CHILLED WATER RETURN	ECCENTRIC REDUCER
HIGH PRESSURE STEAM	UNION
LOW PRESSURE STEAM	SAFETY VALVE
STEAM	2-WAY MODULATING CONTROL VALVE
COMPRESSED AIR	3-WAY MODULATING CONTROL VALVE
GAS	WATER FLOW MEASURING DEVICE
PROPANE GAS	STRAINER
OXYGEN	PRESSURE GAUGE
STORM DRAINAGE	FLEX CONNECTION
STORM DRAINAGE - OVERFLOW	THERMOSTAT
FUEL OIL SUPPLY	NIGHT THERMOSTAT
FUEL OIL RETURN	FLOAT SWITCH
REFRIGERANT - LIQUID	FLOOR DRAIN
REFRIGERANT - SUCTION	POINT OF CONNECTION (POC)
PUMP	POINT OF DISCONNECTION (PODC)
PIP DOWN	

ABBREVIATIONS

A	AIR
ABS	ACRYLON, TRILE-BUTADIENE-STYRENE
A/C	ABOVE CEILING
AC	AIR CONDITIONING
ACP	ASBESTOR CEMENT PIPE
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
ALUM	ALUMINUM
AMP	AMPS
AP	ACCESS PANEL
ARCH	ARCHITECT
AS	AIR SEPARATOR
ASHRAE	AMERICAN SOCIETY OF HEATING REFRIGERATION AND AIR CONDITIONING ENGINEERS
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
BD	BALANCING DAMPER
B/G	BELOW GRADE
BFP	BACKFLOW PREVENTER
BTU	BRITISH THERMAL UNIT
CAP	CAPACITY
CFM	CUBIC FEET PER MINUTE
CL	CENTER LINE
CLG	CEILING
CO	CLEANOUT
COMP	COMPARTMENT
CONC	CONCRETE
CONT	CONTINUED
CONTR	CONTRACTOR
CP	CONTROL PANEL
CW	DOMESTIC COLD WATER
CWR	CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY
DB	DECIBEL
DIA	DIAMETER
DN	DOWN
DMPR	DAMPER
DS	DOWNSPOUT
DWG	DRAWING
EAT	ENTERING AIR TEMPERATURE
ECG	EGG CRATE GRILLE
EFF	EFFICIENCY
EJ	EXPANSION JOINT
ELEC	ELEFCTRICAL
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EXIST	EXISTING
F	FAHRENHEIT
FA	FRESH AIR
FCO	FLOOR CLEAN OUT
FD	FIRE/SMOKE DAMPER OR FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FLEX	FLEXIBLE
FT	FEET
FTG	FOOTING
GA	GAUGE
GAL	GALLON
GC	GENERAL CONTRACTOR
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
HB	HOSE BIB
HFMD	HEATING FLOW MEASURING DEVICE
HP	HORSE POWER
HTG	HEATING
HTR	HEATER
HVAC	HEATING, VENTILATING, AND AIR CONDITIONING
HW	DOMESTIC HOT WATER
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HYD	HYDRANT
INSUL	INSULATION
INV	INVERT
KEC	KITCHEN EQUIPMENT CONTRACTOR
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LB	POUNDS
LIN	LINEAR
LWT	LEAVING WATER TEMPERATURE
M	METER
MAX	MAXIMUM
MECH	MECHANICAL
MIN	MINIMUM
MFG	MANUFACTURER
MH	MANHOLE
MOD	MOTOR OPERATED DAMPER
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OFD	OVERFLOW DRAIN
OFCI	OWNER FURNISH CONTRACTOR INSTALLS
OFOI	OWNER FURNISH OWNER INSTALLS
PLBG	PLUMBING
PSIA	POUNDS/SQ INCH ABSOLUTE
PSIG	POUNDS/SQ INCH GAUGE
PVC	POLYVINYL CHLORIDE
RA	RETURN AIR OR RELIEF AIR
RD	ROOF DRAIN
RECIRC	RECIRCULATING
REF	REFERENCE
REG	REGISTER
REQ	REQUIRED/REQUIREMENTS
RH	RELATIVE HUMIDITY
RHW	RECIRCULATED DOMESTIC HOT WATER
RL	RAIN LEADER
RLA	RELIEF AIR
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SAN	SANITARY
SCW	SOFT COLD WATER
SD	SMOKE DAMPER
SIM	SIMILAR
SP	STATIC PRESSURE
SPECS	SPECIFICATIONS
SQ	SQUARE
SS	SANITARY SEWER
SD	STORM DRAIN
STM	STEAM
TEMP	TEMPERATURE
TOF	TOP OF FAN
TOD	TOP OF DECK
T-STAT	THERMOSTAT
TYP	TYPICAL
UNDG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
V	SANITARY VENT
(V)	VERIFY
VAC	VACUUM
VD	VOLUME DAMPER
VCP	VITRIFIED CLAY PIPE
VEL	VELOCITY
VTR	VENT THRU ROOF
W	WASHER
W/	WITH
W/O	WITHOUT
WCO	WALL CLEAN OUT
WFD	WATER FLOW DEVICE
WP	WATERPROOF OR WEATHER PROOF
MC	MECHANICAL CONTRACTOR
EC	ELECTRICAL CONTRACTOR
FP	FIRE PROTECTION CONTRACTOR

MECHANICAL SYMBOLS

24x12	RECTANGULAR DUCT WITH ACOUSTICAL LINING
	FLEXIBLE CONNECTION IN DUCT
S-1 18x10 400	SIDEWALL GRILLE OR REGISTER WITH TYPE, NECK SIZE, AND AIRFLOW INDICATED (SUPPLY)
R-1 18x10 400	SIDEWALL GRILLE OR REGISTER WITH TYPE, NECK SIZE, AND AIRFLOW INDICATED (RETURN)
	SUPPLY REGISTER OR GRILLE
	EXHAUST OR RETURN REGISTER OR GRILLE
	SQUARE ELBOW WITH TURNING VANES
	STANDARD RADIUS ROUND ELBOW (RADIUS OF CENTERLINE OF DUCT EQUAL TO 1.5 x DUCT WIDTH OR DIAMETER)
	DEMOLITION WORK INDICATED BY CROSSHATCHED LINES OVER ITEMS TO BE REMOVED AS NOTED
	MANUAL VOLUME DAMPER
F	FIRE DAMPER (FD)
S	SMOKE DAMPER (SD)
F/S	COMBINATION FIRE/SMOKE DAMPER (F/S)
M	MOTOR OPERATED DAMPER
	RECTANGULAR DUCT TO CEILING DIFFUSER
	FLEXIBLE ROUND DUCT TO CEILING DIFFUSER
	DASHED LINE INDICATES EQUIPMENT ON ROOF
(UP) (DN)	POSITIVE PRESSURE DUCT - SUPPLY, RELIEF, ETC.
(UP) (DN)	NEGATIVE PRESSURE DUCT - RETURN, EXHAUST, OUTSIDE AIR, ETC.
	RISER THRU FLOOR OR ROOF ABOVE - POS. AND NEG. PRESSURE
24x12	RECTANGULAR DUCT WITH SIZE INDICATED
24Ø	ROUND DUCT WITH SIZE INDICATED

PRIOR APPROVAL SPECIFICATION

MANUFACTURERS' TRADE NAMES AND CATALOG NUMBERS LISTED ARE INTENDED TO INDICATE THE QUALITY OF EQUIPMENT OR MATERIALS DESIRED. MANUFACTURERS NOT LISTED MUST HAVE PRIOR APPROVAL. WRITTEN PRIOR APPROVAL MUST BE OBTAINED FROM THE ARCHITECT/ENGINEER PRIOR TO BID OPENING. REQUESTS ARE TO BE SUBMITTED SUFFICIENTLY AHEAD OF THE DEADLINE TO GIVE AMPLE TIME FOR EXAMINATION. THE ITEMS APPROVED WILL BE LISTED IN AN ADDENDUM AND ONLY THIS LIST OF EQUIPMENT WILL BE ACCEPTED IN LIEU OF SPECIFIED PRODUCTS. SUBMITTALS MUST INDICATE THE SPECIFIC ITEM OR ITEMS TO BE FURNISHED IN LIEU OF THOSE SPECIFIED, TOGETHER WITH COMPLETE TECHNICAL AND COMPARATIVE DATA ON SPECIFIED ITEMS AND PROPOSED ITEMS.

TEMPERATURE CONTROL NOTES

ALL CONTROL WIRING, LINE VOLTAGE WIRING, CONDUIT, ETC. ASSOCIATED WITH THE TEMPERATURE CONTROLS SHALL BE FURNISHED AND INSTALLED BY THE M.C. IF THE M.C. DOES NOT HAVE A STAFFED ELECTRICIAN, THE WORK SHALL BE SUBBED OUT AND INCLUDED IN THE M.C. PRICE.
ALL CONTROL CABLING IN EXPOSED CEILING OR ABOVE INACCESSIBLE CEILING AREAS SHALL BE INSTALLED IN CONDUIT. WHERE CONTROL CABLING IS INSTALLED ABOVE ACCESSIBLE CEILINGS, IT MAY RUN FREE-AIR AND PROPERLY SUPPORTED PER CODE. SEE DIV. 26 FOR CONDUIT REQUIREMENTS.

MECHANICAL SHEET LIST

SHEET NUMBER	SHEET NAME
M0.00	MECHANICAL COVER SHEET
M0.01	MECHANICAL SPECIFICATIONS
M0.02	MECHANICAL SPECIFICATIONS
M0.03	MECHANICAL SPECIFICATIONS
M0.04	MECHANICAL SPECIFICATIONS
M0.05	MECHANICAL SPECIFICATIONS
M0.06	MECHANICAL SPECIFICATIONS
M0.07	MECHANICAL SPECIFICATIONS
M0.08	MECHANICAL SPECIFICATIONS
M0.09	MECHANICAL SPECIFICATIONS
M0.10	MECHANICAL SPECIFICATIONS
M0.11	MECHANICAL SPECIFICATIONS
M0.12	MECHANICAL SPECIFICATIONS
M1.00	PLUMBING PLAN - UNDERFLOOR
M1.01	PLUMBING PLAN - FIRST FLOOR
M1.02	PLUMBING DIAGRAMS
M3.00	HVAC PLAN - FIRST FLOOR
M3.01	HVAC PLAN - ROOF
M5.00	PLUMBING DETAILS
M5.01	MECHANICAL DETAILS
M5.02	PLUMBING SCHEDULES
M5.03	MECHANICAL SCHEDULES
M6.00	CONTROLS
MD1.00	PLUMBING PLAN - UNDERFLOOR DEMOLITION
MD1.01	PLUMBING PLAN - FIRST FLOOR DEMOLITION
MD3.00	HVAC PLAN - FIRST FLOOR DEMOLITION
MD3.01	HVAC PLAN - ROOF DEMOLITION

2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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MARTIN MECHANICAL DESIGN INC
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WIDSETH
ARCHITECTS ▪ ENGINEERS ▪ SCIENTISTS ▪ SURVEYORS

DRAWN BY: MJ
CHECKED BY: JL

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

532

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

MECHANICAL COVER SHEET

M0.00

PROJECT #: 2025-10872

DIVISION 22 - PLUMBING

SECTION 220500

BASIC PLUMBING REQUIREMENTS

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 This Section includes the following:
1. General Plumbing Requirements specifically applicable to all Division 22 Sections.
2. Some piping material and installation instructions common to most piping systems.
3. Equipment installation requirements common to equipment sections.

1.3 DEFINITIONS

A Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.

E Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F Where used in mechanical documents, the word "furnish" shall mean supply for use, the word "install" shall mean connect complete and ready for operation, and the word "provide" shall mean to supply for use and connect complete and ready for operation.
1. Any item listed as furnished shall also be installed, unless otherwise noted.
2. Any item listed as installed shall also be furnished, unless otherwise noted.

1.4 REFERENCES AND STANDARDS:

A The editions recognized by latest adobted versions of the following are hereby included in and made a part of Division 22:
1. National Fire Protection Association
2. Underwriters' Laboratories, Inc.
3. National Electrical Manufacturer's Association
4. National Electric Code
5. American Society of Mechanical Engineers
6. American Welding Society
7. American National Standards Institute
8. American Gas Association
9. Hydronics Institute
10. Occupational Safety and Health Act
11. American Water Works Association
12. Cast Iron Soil Pipe Institute

1.5 QUALITY ASSURANCE AND COORDINATION

A Contractor's Responsibility Prior to Submitting Pricing Data:
1. The Contractor is responsible for constructing complete and operating systems. The Contractor acknowledges and understands that the Contract Documents are a two-dimensional representation of a three-dimensional object, subject to human interpretation. This representation may include imperfect data, interpreted codes, utility guidelines, three-dimensional conflicts, and required field coordination items. Such deficiencies can be corrected when identified prior to ordering material and starting installation. The Contractor agrees to carefully study and compare the individual Contract Documents and report at once in writing to the Design Team any deficiencies the Contractor may discover. The Contractor further agrees to require each subcontractor to likewise study the documents and report at once any deficiencies discovered.
2. The Contractor shall resolve all reported deficiencies with the Architect/Engineer prior to awarding any subcontracts, ordering material, or starting any work with the Contractor's own employees. Any work performed prior to receipt of instructions from the Design Team will be done at the Contractor's risk.

B Electrical Characteristics for Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified at no cost to the owner. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

C Compliance with Codes, Laws, Ordinances:
1. Conform to all requirements of the Codes, Laws, Ordinances and other regulations having jurisdiction.
2. Conform to all State Codes.
3. If there is a discrepancy between the codes and regulations and these specifications, the Architect/Engineer shall determine the method or equipment used.
4. If the Contractor notes, at the time of bidding, any parts of the drawings or specifications that do not comply with the codes or regulations, he shall inform the Architect/Engineer in writing, requesting a clarification. If there is insufficient time for this procedure, he shall submit with his proposal a separate price to make the system comply with the codes and regulations.
5. All changes to the system made after letting of the contract, to comply with codes or requirements of Inspectors, shall be made by the Contractor without cost to the Owner.
6. If there is a discrepancy between manufacturer's recommendations and these specifications, the manufacturer's recommendations shall govern.
7. All work to meet in-force local plumbing code. In the case of discrepancies between the project contract documents and the in-force local code, the most stringent shall govern.

D Engineer or plumbing staff shall walk through and inspect all plumbing work prior to walls or ceilings being closed up, deficiencies shall be noted and given to the project manager in writing. Notify Engineer when project is ready for above ceiling inspection.

E All materials and installations shall meet applicable FM Global requirements.

F Permits, Fees, Taxes, Inspections:
1. Procure all applicable permits and licenses.
2. Abide by all laws, regulations, ordinances, and other rules of the State or Political Subdivision where the work is done, or as required by any duly constituted public authority.
3. Pay all charges for permits or licenses.
4. Pay all fees and taxes imposed by the State, Municipal and/or other regulatory bodies.
5. Pay all charges arising out of required inspections by an authorized body.
6. Pay all charges arising out of required contract document reviews associated with the project and as initiated by the Owner or authorized agency/consultant.
7. It is the sole responsibility of the contractor to obtain and procure permits. The Engineer is not liable for any costs associated with delays associated with permitting or obtaining permits under this division. The engineer at times may submit the plumbing permit in advance to help with project timeline. However, this fact does not relieve the installing contractor(s) from tracking and ensuring permitting proccess is being completed.
8. Where applicable, all fixtures, equipment and materials shall be approved or listed by Underwriter's Laboratories, Inc.

G Utility Company Requirements:
1. Secure from the appropriate private or public utility company all applicable requirements.
2. Comply with all utility company requirements.
3. Make application for and pay for service connections, such as gas.
4. Make application for and pay for all meters and metering systems required by the utility company.

H Examination of Drawings:
1. The drawings for the mechanical work are completely diagrammatic, intended to convey the scope of the work and to indicate the general arrangements and locations of equipment, outlets, etc., and the approximate sizes of equipment.
2. Contractor shall determine the exact locations of equipment and rough-ins, and the exact routing of pipes and ducts to best fit the layout of the job.
3. Scaling of the drawings is not sufficient or accurate for determining these locations.
4. Where job conditions require reasonable changes in indicated arrangements and locations, such changes shall be made by the Contractor at no additional cost to the Owner.
5. Because of the scale of the drawings, certain basic items, such as fittings, boxes, valves, unions, etc., may not be shown, but where required by other sections of the specifications or required for proper installation of the work, such items shall be furnished and installed.
6. If an item is either on the drawings or in the specifications, it shall be included in this contract.
7. Determination of quantities of material and equipment required shall be made by the Contractor from the documents. Where discrepancies arise between drawings, schedules and/or specifications, the greater number shall govern.

I Field Measurements:
1. Verify all pertinent dimensions at the job site before ordering any materials or fabricating any supports, pipes or ducts.

J Electronic Media/Files:
1. Construction drawings for this project have been prepared utilizing Revit or Cadd platforms
2. Contractors and Subcontractors may request electronic media files of the contract drawings and/or copies of the specifications. Specifications will be provided in PDF format.
3. Upon request for electronic media, the Contractor shall complete and return a signed "Electronic File Transmittal" form provided by Engineer.
4. If the information requested includes floor plans prepared by others, the Contractor will be responsible for obtaining approval from the appropriate Design Professional for use of that part of the document.
5. The electronic contract documents can be used for preparation of shop drawings and as-built drawings only. The information may not be used in whole or in part for any other project.
6. The drawings prepared by Engineer for bidding purposes may not be used directly for ductwork layout drawings or coordination drawings.
7. The use of these CAD documents by the Contractor does not relieve them from their responsibility for coordination of work with other trades and verification of space available for the installation.
8. The information is provided to expedite the project and assist the Contractor with no guarantee by Engineer as to the accuracy or correctness of the information provided. Engineer accepts no responsibility or liability for the Contractor's use of these documents.

1.6 SUBMITTALS

A Submittals shall be required for the following items, and for additional items where required elsewhere in the specifications or on the drawings.

B General Submittal Procedures: In addition to the provisions of Division 1, the following are required:
1. Transmittal: Each transmittal shall include the following:
   a. Date
   b. Project title and number
   c. Contractor's name and address
   d. Division of work (e.g., plumbing, heating, ventilating, etc.)
   e. Description of items submitted and relevant specification number
   f. Notations of deviations from the contract documents
   g. Other pertinent data
2. Submittal Cover Sheet: Each submittal shall include a cover sheet containing:
   a. Date
   b. Project title and number
   c. Architect/Engineer
   d. Contractor and subcontractors' names and addresses
   e. Supplier and manufacturer's names and addresses
   f. Division of work (e.g., plumbing, heating, ventilating, etc.)
   g. Description of item submitted (using project nomenclature) and relevant specification number
   h. Notations of deviations from the contract documents
   i. Other pertinent data
   j. Provide space for Contractor's review stamps
3. Composition:
   a. Submittals shall be submitted using specification sections and the project nomenclature for each item.
   b. Individual submittal packages shall be prepared for items in each specification section. All items within a single specification section shall be packaged together where possible. An individual submittal may contain items from multiple specifications sections if the items are intimately linked (e.g., pumps and motors).
   c. All sets shall contain an index of the items enclosed with a general topic description on the cover.
4. Content: Submittals shall include all fabrication, erection, layout, and setting drawings; manufacturers' standard drawings; schedules; descriptive literature, catalogs and brochures; performance and test data; wiring and control diagrams; dimensions; shipping and operating weights; shipping splits; service clearances; and all other drawings and descriptive data of materials of construction as may be required to show that the materials, equipment or systems and the location thereof conform to the requirements of the contract documents.
5. Contractor's Approval Stamp:
   a. The Contractor shall thoroughly review and approve all shop drawings before submitting them to the Architect/Engineer. The Contractor shall stamp, date and sign each submittal certifying it has been reviewed.
   b. Unstamped submittals will be rejected.
   c. The Contractor's review shall include, but not be limited to, verification of the following:
      1) Only approved manufacturers are used.
      2) Addenda items have been incorporated.
      3) Catalog numbers and options match those specified.
      4) Performance data matches that specified.
      5) Electrical characteristics and loads match those specified.
      6) Equipment connection locations, sizes, capacities, etc. have been coordinated with other affected trades.
      7) Dimensions and service clearances are suitable for the intended location.
      8) Equipment dimensions are coordinated with support steel, housekeeping pads, openings, etc.
      9) Constructability issues are resolved (e.g., weights and dimensions are suitable for getting the item into the building and into place, sinks fit into countertops, etc.).
   d. The Contractor shall review, stamp and approve all subcontractors' submittals as described above.
   e. The Contractor's approval stamp is required on all submittals. Approval will indicate the Contractor's review of all material and a complete understanding of exactly what is to be furnished. Contractor shall clearly mark all deviations from the contract documents on all submittals. If deviations are not marked by the Contractor, then the item shall be required to meet all drawing and specification requirements.
6. Submittal Identification and Markings:
   a. The Contractor shall clearly mark each item with the same nomenclature applied on the drawings or in the specifications.
   b. The Contractor shall clearly indicate the size, finish, material, etc.
   c. Where more than one model is shown on a manufacturer's sheet, the Contractor shall clearly indicate exactly which item and which data is intended.
   d. All marks and identifications on the submittals shall be unambiguous.
7. Schedule submittals to expedite the project. Coordinate submission of related items.
8. Identify variations from the contract documents and product or system limitations that may be detrimental to the successful performance of the completed work.
9. Reproduction of contract documents alone is not acceptable for submittals.
10. Incomplete submittals will be rejected without review. Partial submittals will only be reviewed with prior approval from the Architect/Engineer.
11. Submittals not required by the contract documents may be returned without review.
12. The Architect/Engineer's responsibility shall be to review one set of shop drawing submittals for each product. If the first submittal is incomplete or does not comply with the drawings and/or specifications, the Contractor shall be responsible to bear the cost for the Architect/Engineer to recheck and handle the additional shop drawing submittals.
13. Submittals shall be reviewed and approved by the Architect/Engineer before
   a. releasing any equipment for manufacture or shipment.
14. Contractor's responsibility for errors, omissions or deviation from the contract documents in submittals is not relieved by the Architect/Engineer's approval.

C Electronic Submittal Procedures:
1. Distribution: Email submittals as attachments to all parties designated by the Architect/Engineer, unless a web-based submittal program is used.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
   a. Submittal file name: 2025-101SD 23 XX XX description.pdf
5. File Size: Electronic file size shall be limited to a maximum of 10MB. Larger files shall be transmitted via a pre-approved method.

1.7 DELIVERY, STORAGE, AND HANDLING

A Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

C Exercise care in transporting and handling to avoid damage to materials. Store materials on the site to prevent damage. Keep materials clean, dry and free from harmful conditions. Immediately remove any materials that become wet or that are suspected of becoming contaminated with mold or other organisms.

D Coordinate the installation of heavy and large equipment with the Construction Manager or General Contractor. If the Mechanical Contractor does not have prior documented experience in rigging and lifting similar equipment, he/she shall contract with a qualified lifting and rigging service that has similar documented experience. Follow all equipment lifting and support guidelines for handling and moving.

E Contractor is responsible for moving equipment into the building and/or site. Contractor shall review site prior to bid for path locations and any required building modifications to allow movement of equipment. Contractor shall coordinate his/her work with other trades.

1.8 WARRANTY

A Provide one-year warranty, unless otherwise noted, to the Owner for all fixtures, equipment, materials, and workmanship from date of substantial completion.

B The warranty period for all work in this Division of the specifications shall commence on the date of final acceptance, unless a whole or partial system or any separate piece of equipment or component is put into use for the benefit of any party other than the installing contractor with prior written authorization. In this instance, the warranty period shall commence on the date when such whole system, partial system or separate piece of equipment or component is placed in operation and accepted in writing by the Owner.

1.9 COORDINATION

A Contractor shall coordinate the work of the different trades so that interference between piping, equipment, structural, and electrical work will be avoided. All necessary offsets in piping and ductwork, and all fittings, and other components, required to install the work properly shall be furnished complete in place at no additional cost.

B Unless otherwise stipulated under a particular heading, the following rules relative to responsibilities of the Contractors and Subcontractors will apply:
1. Make-up water piping connections shall be provided by the Plumbing Contractor to within five (5) feet of the required point of connection to the equipment and there terminated with a shut-off valve. Each trade shall make the final connection to the equipment it installs.
2. Ceiling access panels will be installed by the General Contractor at locations determined by the Plumbing Contractor.
3. The Plumbing Contractor or subcontractor shall install all roughing-in pertaining to his trade for each item of equipment furnished under another Section of the Specifications or by the Owner.
4. The Plumbing Contractor shall make final connections of equipment to rough-ins.

1.10 MATERIAL SUBSTITUTION

A Where several manufacturers' names are given, the manufacturer for which a catalog number is given is the basis for job design and establishes the quality required.

B Equivalent equipment manufactured by the other named manufacturers may be used. Contractor shall ensure that all items submitted by these other manufacturers meet all requirements of the drawings and specifications, and fits in the allocated space.

C Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better than the material, article or equipment identified by the drawings and specifications may be used if approval is secured in writing from the Architect/Engineer not later than ten days prior to the bid opening.

D This Contractor assumes all costs incurred as a result of using the offered material, article or equipment, on his part or on the part of other Contractors whose work is affected.

E This Contractor may list voluntary add or deduct prices for alternate materials on the bid form. These items will not be used in determining the low bidder.

F All material substitutions requested later than ten (10) days prior to bid opening must be listed as voluntary changes on the bid form.

1.11 TESTING AND REPAIR

A All piping and systems shall be thoroughly cleaned and flushed prior to final testing.

B Pressure testing shall be completed for the following piping systems:
1. Domestic water, sanitary and vent, storm and gas piping systems, and other systems as noted on the plans.

C All testing must be witnessed and accurately recorded noting methods of testing, times, dates, and results.

D Any damage as a result of tests shall be repaired or damaged materials replaced at no cost to the Owner.

1.12 FINAL COMPLETION

A All work shall be cleaned prior to issuance of Substantial Completion.

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B Retouch or repaint factory painted prime and finish coats where scratched or damaged.
C Deliver any equipment as required by this Specification to Owner and obtained signed receipts of delivery.
D Clean equipment, restore damaged materials, and leave the Work in acceptable condition.
E Remove all site tools, equipment, surplus materials and rubbish continuously at no additional cost to the Owner.
F Contractor shall submit written certificates warranting each item of equipment.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS:

A All equipment and materials shall be furnished in strict accordance with the equipment named and according to Specification requirements. Each bid shall be based upon one of the materials or manufacturers specified.
B Equipment and materials specified shall be considered to have prior approval, but submittal for approval is required. Furnish construction drawings to other Contractors when required to coordinate construction.
C Where multiple manufacturers are named the drawings and specifications are based on the requirements and layouts for the equipment of the first named manufacturer. Any change required by the use of other named manufacturers such as revisions to foundations, bases, piping, controls, wiring, openings, and appurtenances shall be made by the Contractor at no additional cost to the Owner.

2.2 PIPE, TUBE, AND FITTINGS - GENERAL

A Refer to individual Division 22 Piping Sections for pipe, tube, and fitting materials and joining methods.
B Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

PART 3 - EXECUTION

3.1 PLUMBING DEMOLITION (WHEN INDICATED ON THE DRAWINGS)

A Refer to applicable Division 01 Section covering cutting and patching and applicable Division 02 Section covering selective structure demolition for general demolition requirements and procedures.
B If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.
C All unused waste, water and vent that is no longer in service shall be removed from ceilings, walls and floors. No dead piping will be allowed to stay. Underground piping shall also be removed. If piping cannot be removed underground it shall be capped at the main and the pipe shall be pumped and filled with a flowable fill.
D A MOP will be required when filling abandoned sewers, old water mains or any plumbing piping that is buried in the ground.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A All materials and/or equipment shall be installed per manufacturer's recommendations and instructions.
B When temporary water is required, an approved backflow device shall be used and testing reports from device shall be sent to plumbing foreman for verification.
C Install piping according to the following requirements and Division 22 Sections specifying piping systems.
D Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
E Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
F Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
G Piping shall not project beyond walls or steel lines nor shall it hang below slabs more than is absolutely necessary. Particular attention shall be paid to the required clearances.
H Offset piping where required to avoid interference with other work, to provide greater headroom or clearance, or to conceal pipe more readily. Offsets shall be properly drained or trapped where necessary.
I Provide swing joints and expansion bends wherever required to allow the piping to expand without undue stress to connections or equipment.
J Exposed piping around fixtures or in other conspicuous places shall not show tool marks at fittings.
K Isolate pipe from the building construction to prevent transmission of vibration to the structure and to eliminate noise.
L Install piping such that any equipment connected to piping may be removed by disconnecting two (2) flanges or unions and removing only one or two pipe sections. All equipment shall have bolted or screwed flanges or unions at pipe connections.
M Install fittings for changes in direction and branch connections. T-drill system for mechanically formed tee connections and couplings, and Victaulic hole cut piping system are not allowed.
N Do not route piping through transformer vaults or above transformers, panelboards, or switchboards, including the required service space for this equipment, unless the piping is serving this equipment.
O Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
P Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
Q Install piping to permit valve servicing.
R Install piping at indicated slopes.
S Install piping free of sags and bends.
T Install piping to allow application of insulation.
U Eccentric reducing couplings shall be provided in all cases where air or water pockets would otherwise occur due to a reduction in pipe size.
V Cap and plug all openings in pipes during construction with suitable metal plugs or cap to keep out dirt and rubbish until equipment is connected.
W Install drains, consisting of a tee fitting, NPS 3/4 full port-ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
X Select system components with pressure rating equal to or greater than system operating pressure.
Y Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
Z Verify final equipment locations for roughing-in.
AA AA. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.
BB BB. Provide proper access to materials and equipment that require inspection, repair, service, or maintenance.
CC CC. Minimum service access size for materials equipment/components above ceilings shall be 24" square.
DD All piping sized utililizing copper pipe as the base material. Installating contractor shall upsize piping according to ensure equal pressure drop. Changes to plumbing system to increase flow and reduce pressure drop to meet design shall be at the sole cost of the installing contractor.

3.3 PIPING JOINT CONSTRUCTION

A Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
B Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
C Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
D Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

3.4 PIPING CONNECTIONS

A Pipe sizes indicated shall be carried full size to equipment served. Any change of size to match equipment connection shall be made within one foot of the equipment. At temperature control valves with sizes smaller than connected lines, reduction shall be made immediately adjacent to valves.

3.5 EXCAVATION, FILL, BACKFILL, COMPACTION

A General:
1. Prior to the commencement of any excavation or digging, the Contractor shall verify all underground utilities with the regional utility locator. Provide prior notice to the locator before excavations. Contact information for most regional utility locaters can be found by calling 811.
2. The Contractor shall do all excavating, filling, backfilling and compacting associated with his work.

B Excavation:
1. Make all excavations to accurate, solid, undisturbed earth, and to proper dimensions.
2. Where excavations are made in error below foundations, concrete of same strength as specified for the foundations or thoroughly compacted sand-gravel fill, as determined by the Architect/Engineer, shall be placed in such excess excavations. Place thoroughly compacted, clean, stable fill in excess excavations under slabs on grade, at the Contractor's expense.
3. Trim bottom and sides of excavations to grades required for foundations.
4. Protect excavations against frost and freezing.
5. Take care in excavating not to damage surrounding structures, equipment or buried pipe. Do not undermine footing or foundation.
6. Perform all trenching in a manner to prevent cave-ins and risk to workmen.
7. Where original surface is pavement or concrete, the surface shall be saw cut to provide clean edges and assist in the surface restoration.
8. Where satisfactory bearing soil for foundations is not found at the indicated levels, the Architect/Engineer or their representative shall be notified immediately, and no further work shall be done until further instructions are given by the Architect/Engineer or their representative.

C Dewatering:
1. Contractor shall furnish, install, operate and remove all dewatering pumps and pipes needed to keep trenches and pits free of water to complete their work.

D Underground Obstructions:
1. Known underground piping, foundations, and other obstructions in the vicinity of construction are shown on the drawings. Use great care in making installations near underground obstruction.
2. If objects not shown on the drawings are encountered, remove, relocate, or perform extra work as directed by the Architect/Engineer.

E Fill and Backfilling:
1. No rubbish or waste material is permitted for fill or backfill.
2. Provide all necessary sand for backfilling.
3. Dispose of the excess excavated earth as directed.
4. Backfill materials shall be suitable for required compaction, clean and free of perishable materials and stones greater than 4 inches in diameter. Water shall not be permitted to rise in unbackfilled trenches. No material shall be used for backfilling that contains frozen earth, debris or earth with a high void content.
5. Backfill all trenches and excavations immediately after installing pipes, or removal of forms, unless other protection is provided.
6. Around piers and isolated foundations and structures, backfill and fill shall be placed and consolidated simultaneously on all sides to prevent wedge action and displacement. Fill and backfill materials shall be spread in 6 inch uniform horizontal layers with each layer compacted separately to required density.
7. Lay all piping on a compacted bed of sand at least 3 inches deep. Backfill around pipes with sand, 6 inch layers, and compact each layer.
8. Use sand for backfill up to grade for all piping under slabs or paved areas. All other piping shall have sand backfill to 6 inches above the top of the pipe.
9. Place all backfill above the sand in uniform layers not exceeding 6 inches deep. Each layer shall be placed, then carefully and uniformly tamped, to eliminate lateral or vertical displacement.
10. Where the fill and backfill will ultimately be under a building, floor or paving, each layer of fill shall be compacted to 95% of the maximum density determined by AASHTO Designation T-99 or ASTM Designation D-698. Moisture content of soil at time of compaction shall not exceed plus or minus 2% of optimum moisture content determined by AASHTO T-99 or ASTM D-698 test.

F Surface Restoration:
1. Where trenches are cut through graded, planted or landscaped areas, the areas shall be restored to the original condition. Replace all planting removed or damaged to its original condition. A minimum of 6 inches of topsoil shall be applied where disturbed areas are to be seeded or sodded.
2. Concrete or asphalt type pavement, seal coat, rock, gravel or earth surfaces removed or damaged shall be replaced with comparable materials and restored to original condition.

3.6 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
B Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
C Install Plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
D Install equipment to allow right of way for piping installed at required slope.

3.7 PROJECT CLOSEOUT

A The following paragraphs supplement the requirements of Division 1.
B Final Jobsite Observation:
1. In order to prevent the Final Jobsite Observation from occurring too early, the Contractor is required to review the completion status of the project and certify that the job is ready for the final jobsite observation.
2. Attached to the end of this section is a typical list of items that represent the degree of job completeness expected prior to requesting a review.
3. Upon Contractor certification that the project is complete and ready for a final observation, the Contractor shall sign the attached certification and return it to the Architect/Engineer so that the final observation can be scheduled.
4. It is understood that if the Architect/Engineer finds the job not ready for the final observation and that additional trips and observations are required to bring the project to completion, the costs incurred by the Architect/Engineer's additional time and expenses will be deducted from the Contractor's contract retainage prior to final payment at the completion of the job.
C Before final payment is authorized, this Contractor must submit the following:
1. Operation and maintenance manuals with copies of approved shop drawings.
2. Record documents including marked-up or reproducible drawings and specifications.
3. A report documenting the instructions given to the Owner's representatives complete with the number of hours spent in the instruction. The report shall bear the signature of an authorized agent of This Contractor and shall be signed by the Owner's representatives.
4. Inspection by State Boiler Inspector.
5. Start-up reports on all equipment requiring a factory installation inspection or start- up.
6. Provide spare parts, maintenance, and extra materials in quantities specified in individual specification sections. Deliver to project site and place in location as directed; receipt by Architect/Engineer required prior to final payment approval.

3.8 OPERATION AND MAINTENANCE MANUALS

A General:
1. Provide an electronic copy of the O&M manuals as described below for Architect/Engineer's review and approval. The electronic copy shall be corrected as required to address the Architect/Engineer's comments. Once corrected, electronic copies and paper copies shall be distributed as directed by the Architect/Engineer.
2. Approved O&M manuals shall be completed and in the Owner's possession prior to Owner's acceptance and at least 10 days prior to instruction of operating personnel.

B Electronic Submittal Procedures:
1. Distribution: Email the O&M manual as attachments to all parties designated by the Architect/Engineer.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
a. O&M file name:
O&M.div22.contractor.YYYYMMDD
5. File Size: Electronic file size shall be limited to a maximum of 10MB. Larger files shall be divided into files that are clearly labeled as "1 of 2", "2 of 2", etc.
6. Provide the Owner with an approved copy of the O&M manual in digital format which is tabbed and bookmarked accordingly.
7. All text shall be searchable.
8. Bookmarks shall be used, dividing information first by specification section, then systems, major equipment and finally individual items. All bookmark titles shall include the nomenclature used in the construction documents and shall be an active link to the first page of the section being referenced.

C Operation and Maintenance Instructions shall include:
1. Title Page: Include title page with project title, Architect, Engineer, Contractor, all subcontractors, and major equipment suppliers, with addresses, telephone numbers, website addresses, email addresses and point of contacts. Website URLs and email addresses shall be active links in the electronic submittal.
2. Table of Contents: Include a table of contents describing specification section, systems, major equipment, and individual items.
3. Copies of all final approved shop drawings and submittals. Include Architect's/Engineer's shop drawing review comments. Insert the individual shop drawing directly after the Operation and Maintenance information for the item(s) in the review form.
4. Copy of final approved test and balance reports.
5. Copies of all factory inspections and/or equipment startup reports.
6. Copies of warranties.
7. Schematic wiring diagrams of the equipment that have been updated for field conditions. Field wiring shall have label numbers to match drawings.
8. Dimensional drawings of equipment.
9. Capacities and utility consumption of equipment.
10. Detailed parts lists with lists of suppliers.
11. Operating procedures for each system.
12. Maintenance schedule and procedures. Include a chart listing maintenance requirements and frequency.
13. Repair procedures for major components.
14. List of lubricants in all equipment and recommended frequency of lubrication.
15. Instruction books, cards, and manuals furnished with the equipment.

3.9 RECORD DOCUMENTS

A The following paragraph supplements Division 1 requirements:
1. Contractor shall maintain at the job site a separate and complete set of mechanical drawings and specifications on which he shall clearly and permanently mark in complete detail all changes made to the mechanical systems.
B Mark drawings to indicate revisions to piping and plumbing systems size and location, both exterior and interior.
C Before completion of the project, a set of reproducible mechanical drawings will be given to the Contractor for transfer of all as-built conditions from the paper set maintained at the job site. All marks on reproducibles shall be clear and permanent.
D Mark specifications to show approved substitutions; Change Orders, and actual equipment and materials used.
E Record changes daily and keep the marked drawings available for the Architect/Engineer's examination at any normal work time.
F Upon completing the job, and before final payment is made, give the marked-up drawings to the Architect/Engineer.

END OF SECTION

SECTION 220519
METERS AND GAUGES FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A Pressure gauges.
B Thermometers.
C Pressure-temperature test plugs.

1.2 REFERENCE STANDARDS

A ASME B40.100 - Pressure Gauges and Gauge Attachments; 2022.
B ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014 (Reapproved 2020).
C ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014 (Reapproved 2021).
D UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Current Edition, Including All Revisions.
E UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.
B Product Data: Provide red-marked product data sheets for each furnished item with associated components and accessories.

PART 2 PRODUCTS

2.1 PRESSURE GAUGES

A Pressure Gauges: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
1. Case: Stainless Steel casing with brass or stainless burbon tube sensor.
2. Size: 3-1/2 inch diameter.
3. Mid-Scale Accuracy: One percent.
4. Scale: Psi.
5. Liquid Filled: Glycerine

2.2 THERMOMETERS

A General:
1. Product Compliance: ASTM E1.
2. Lens: Clear glass, except where stated.
3. Accuracy: One percent, when tested in accordance with ASTM E77, except where stated.
4. Scale: Black markings depicting single scale in degrees F where expected process value falls half-span of standard temperature range.
B Thermometers - Adjustable Angle: 7 inch v-shape aluminum case with clear glass window scale, 6 inch NPT stem, red or blue organic non-toxic liquid filled glass tube, and adjustable joint with positive locking device allowing 360 degrees in horizontal plane or 180 degrees in vertical plane adjustments.
C Thermometers - Dial Type:
1. Fixed: 5 inch diameter dial with black pointer, stainless steel case, silicone damping bimetal element, hermetically sealed lens, recalibrating screw, and 2-1/2 inch NPT stem.

2.3 PRESSURE-TEMPERATURE TEST PLUGS:

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A Size: 500 psi capacity; 1/2 inch MPT brass fitting with gasket, cap, and retaining strap for 1/8 inch pressure gauge or temperature probe.
B Wetted Materials per Temperature Range:
1. Up to 200 degrees F: Brass probe with neoprene core.

PART 3 EXECUTION

3.1 EXAMINATION

A Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports, and test plugs.

3.2 INSTALLATION

A Install pressure gauges as follows:
1. At Pumps: Place single gauge before strainer, suction side and discharge side.
2. Include gauge cock to isolate each gauge and extend nipples for insulation clearance.

B Install thermometers as follows:
1. Hot Water Heaters: Place upstream and downstream of heater. Add one on the inlet end when using steam as the water heating medium.

END OF SECTION

SECTION 220553
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A Nameplates.
B Tags.
C Stencils.
D Pipe markers.

1.2 RELATED REQUIREMENTS

A Section 099123 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

A ASME A13.1 - Scheme for the Identification of Piping Systems; 2020.

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.

PART 2 PRODUCTS

2.1 PLUMBING COMPONENT IDENTIFICATION GUIDELINE

A Stencil:
1. Piping: 3/4 inch diameter and higher.

B Pipe Markers: 3/4 inch diameter and higher.

2.2 NAMEPLATES

A Description: Laminated piece with up to three lines of text.
1. Letter Color: White.
2. Letter Height: 1/4 inch.

2.3 TAGS

A Flexible: Vinyl with engraved black letters on light contrasting background color with up to three lines of text. Minimum tag size 1-1/2 inch in diameter.

2.4 STENCILS

A Pipe: Stencil size required per external insulated or uninsulated pipe diameter.
1. 3/4 to 1-1/4 inch Range: 1/2 inch text over 8 inch long background.
2. 1-1/2 to 2 inch Range: 3/4 inch text over 8 inch long background.
3. 2-1/2 to 6 inch Range: 1-1/4 inch text over 12 inch long background.

B Stencil Paint: As specified in Section 099123, semi-gloss enamel, colors complying with ASME A13.1.
C Fluid Service Identification Scheme, ASME A13.1:
1. Water; Potable, Cooling, Boiler Feed and Other: White text on green background.

2.5 PIPE MARKERS

A Comply with ASME A13.1.
B Flexible Marker: Factory fabricated, semi-rigid, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid conveyed.
C Flexible Tape Marker: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
D Identification Scheme, ASME A13.1:
1. Primary: External Pipe Diameter, Uninsulated or Insulated.
a. 3/4 to 1-1/4 inches: Use 8 inch field-length with 1/2 inch text height.
b. 1-1/2 to 2 inches: Use 8 inch field-length with 3/4 inch text height.
c. 2-1/2 to 6 inches: Use 12 inch field-length with 1-1/4 inch text height.
d. 8 to 10 inches: Use 24 inch field-length with 2-1/2 inch text height.
2. Secondary: Color scheme per fluid service.
a. Combustible Fluids: White text on brown background.
b. Compressed Air: White text on blue background.
c. Fire Quenching Fluids: White text on red background.
d. Water; Potable, Cooling, Boiler Feed, and Other: White text on green background.
3. Tertiary: Other Details.
a. Directional flow arrow.

PART 3 EXECUTION

3.1 PREPARATION

A Degrease and clean surfaces to receive identification products.

3.2 INSTALLATION

A Apply stencil painted identification in compliance with Section 099123 requirements. Identify unit with assigned id-number and area being served using pipe marking rules.
B Apply ASME A13.1 Pipe Marking Rules:
1. Place pipe marker adjacent to changes in direction.
2. Place pipe marker adjacent each valve port and flange end.
3. Place pipe marker at both sides of floor and wall penetrations.
4. Place pipe marker every 25 to 50 feet interval of straight run.

END OF SECTION

SECTION 220719
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A Glass fiber insulation.
B Jacketing and accessories.

1.2 RELATED REQUIREMENTS

A Section 078400 - Firestopping.

1.3 REFERENCE STANDARDS

A ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).
B ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2019).
C ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2019).
D ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2022a.
E ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).
F ASTM C1423 - Standard Guide for Selecting Jacketing Materials for Thermal Insulation; 2021.
G ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
H ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).
I SAE AMS3779 - Tape, Adhesive, Pressure-Sensitive Thermal Radiation Resistant, Aluminum Coated Glass Cloth; 2016b.
J UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.
B Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
C Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.5 QUALITY ASSURANCE

A Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
B Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 5 years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 FIELD CONDITIONS

A Maintain ambient conditions required by manufacturers of each product.
B Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER INSULATION

A Manufacturers:
1. CertainTeed Corporation: www.certainteed.com/#sle.
2. Johns Manville Corporation: www.jm.com/#sle.
3. Knauf Insulation: www.knaufinsulation.com/#sle.
4. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: www.ocbuildingspec.com/#sle.

B Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
1. K Value: ASTM C177, 0.24 at 75 degrees F.
2. Maximum Service Temperature: 850 degrees F.
3. Maximum Moisture Absorption: 0.2 percent by volume.

C Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible, with wicking material to transport condensed water to the outside of the system for evaporation to the atmosphere.
1. K Value: ASTM C177, 0.23 at 75 degrees F.
2. Maximum Service Temperature: 220 degrees F.
3. Maximum Moisture Absorption: 0.2 percent by volume.

D Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm.
E Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
F Vapor Barrier Lap Adhesive: Compatible with insulation.
G Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.
H Insulating Cement: ASTM C449.
I PVC fitting covers

2.3 JACKETING AND ACCESSORIES

A PVC Plastic Jacket:
1. Manufacturers:
2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
a. Minimum Service Temperature: 0 degrees F.
b. Maximum Service Temperature: 150 degrees F.
c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
d. Thickness: 10 mil, 0.010 inch.
e. Connections: Brush on welding adhesive.
3. Covering Adhesive Mastic: Compatible with insulation.

B Reinforced Tape:
1. FSK tape suitable for sealing seams between insulation, insulated pipe bends, and fittings resulting in a tight, smooth surface without wrinkles.
2. Comply with UL 723 or ASTM E84.
3. Moisture Vapor Permeability: 0.00 perm inch, when tested in accordance with ASTM E96/E96M.
4. Finish: Match insulation.

PART 3 EXECUTION

3.1 EXAMINATION

A Verify that piping has been tested before applying insulation materials.
B Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A Install in accordance with manufacturer's instructions.
B Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.
C Exposed Piping: Locate insulation and cover seams in least visible locations.
D Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
E Glass fiber insulated pipes conveying fluids below ambient temperature:
1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
F For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
G For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
H Glass fiber insulated pipes conveying fluids above ambient temperature:
1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
I Inserts and Shields:
1. Application: Piping 1-1/2 inches diameter or larger.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
3. Insert Location: Between support shield and piping and under the finish jacket.
4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
J Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 078400.

3.3 SCHEDULES

A Insulation of Piping shall be in accordance with table C403.13.3 of the IECC 2024 addition
B Domestic Hot Water and Recirculated Domestic Hot Water
1. Pipe Size up to 1 1/2" = 1" Insulation
2. Pipe Size Over 1 1/2" to 8" = 1.5" Insulation
C Domestic Cold Water
1. Pipe Size up to 1 1/2" = 1/2" Insulation
2. Pipe Size Over 1 1/2" to 8" = 1.0" Insulation

END OF SECTION

SECTION 221005
PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A Sanitary waste piping, buried within 5 feet of building.
B Sanitary waste piping, above grade.
C Domestic water piping, above grade.
D Pipe flanges, unions, and couplings.
E Pipe hangers and supports.
F Ball valves.
G Flow-balancing valves.
H Strainers.

1.2 RELATED REQUIREMENTS

A Section 220529 - Hangers and Supports for Plumbing Piping and Equipment.
B Section 220553 - Identification for Plumbing Piping and Equipment.
C Section 220719 - Plumbing Piping Insulation.

1.3 REFERENCE STANDARDS

A ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
B ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
C ASME B31.9 - Building Services Piping; 2020.
D ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023, with Errata (2024).
E ASTM B32 - Standard Specification for Solder Metal; 2020.
F ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
G ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
H ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2016.
I ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2023.
J ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020.
K ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2020.
L ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020.
M ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2023.
N AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2019.
O AWWA C651 - Disinfecting Water Mains; 2023.
P CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2021.
Q CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2020.
R ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2018, with Editorial Revision (2020).
S ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry; 2018, with Editorial Revision (2020).
T ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2017, with Editorial Revision (2020).
U ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2023.
V MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).
W MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .
X NSF 61 - Drinking Water System Components - Health Effects; 2024.
Y NSF 372 - Drinking Water System Components - Lead Content; 2024.

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.
B Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
C Welders' Certificates: Submit certification of welders' compliance with ASME BPVC-IX.
D Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

1.5 QUALITY ASSURANCE

A Perform work in accordance with applicable codes.
B Valves: Manufacturer's name and pressure rating marked on valve body.
C Welding Materials and Procedures: Comply with ASME BPVC-IX and applicable state labor regulations.
D Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.
E Mechanical Coupling for grooved installations shall have a labor and material warranty for 10 years. Including insurance for damaged caused by failure of 1 Million.
F All plumbing piping has been sized by engineer utilizing copper domestic water piping. All other materials being utilized its the sole responsibility of the installing contractor to verify pipe pressure loss and upsize piping and fittings accordingly to match design pressure loss of the system.

1.6 DELIVERY, STORAGE, AND HANDLING

A Accept valves on site in shipping containers with labeling in place. Inspect for damage.
B Provide temporary protective coating on cast iron and steel valves.
C Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
D Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.7 FIELD CONDITIONS

A Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.2 SANITARY WASTE PIPING, BURIED WITHIN 5 FEET OF BUILDING

A PVC Pipe: ASTM D2665.
1. Fittings: PVC.
2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 SANITARY WASTE PIPING, ABOVE GRADE

A Cast Iron Pipe: CISPI 301, hubless, service weight.
1. Fittings: Cast iron.
2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.4 DOMESTIC WATER PIPING, ABOVE GRADE

A All piping sized utililizing copper pipe as the base material. Installating contractor shall modify piping sizes according to ensure equal pressure drop if other than copper piping is utilized. Changes after the fact to plumbing system to increase flow and reduce pressure drop to meet design shall be at the sole cost of the installing contractor.
B Copper Pipe: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
2. Joints: ASTM B32, alloy Sn95 solder.
3. Mechanical Press Sealed Fittings: Double-pressed type, NSF 61 and NSF 372 approved or certified, utilizing EPDM, nontoxic, synthetic rubber sealing elements.
a. Manufacturers:
1) Anvil International: www.anvilintl.com/#sle.
2) FNW; Copper Press: www.fnw.com/#sle.
3) Viega Propress.

2.5 PIPE FLANGES, UNIONS, AND COUPLINGS

A Unions for Pipe Sizes 3 inch and Under:
1. Ferrous Pipe: Class 150 malleable iron threaded unions.
2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
B Flanges for Pipe Sizes Over 1 inch:
1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
C Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.6 PIPE HANGERS AND SUPPORTS

A Provide hangers and supports that comply with MSS SP-58.
1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.

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3. Trapeze Hangers: Welded steel channel frames attached to structure.
4. Vertical Pipe Support: Steel riser clamp.

B Plumbing Piping - Drain, Waste, and Vent:
1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
2. Hangers for Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
3. Wall Support for Pipe Sizes to 3 inch: Cast iron hook.
4. Wall Support for Pipe Sizes 4 inch and Over: Welded steel bracket and wrought steel clamp.

C Plumbing Piping - Water:
1. Hangers for Cold Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
2. Hangers for Hot Pipe Sizes 2 to 4 inch: Carbon steel, adjustable, clevis.
3. Hangers for Hot Pipe Sizes 6 inch and Larger: Adjustable steel yoke, cast iron pipe roll, double hanger.
4. Wall Support for Pipe Sizes 4 inch and Larger: Welded steel bracket and wrought steel clamp.

D Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
1. Concrete Wedge Expansion Anchors: Comply with ICC-ES AC193.
2. Masonry Wedge Expansion Anchors: Comply with ICC-ES AC01.
3. Concrete Screw Type Anchors: Comply with ICC-ES AC193.
4. Masonry Screw Type Anchors: Comply with ICC-ES AC106.
5. Concrete Adhesive Type Anchors: Comply with ICC-ES AC308.

2.7 BALL VALVES

A Manufacturers:
1. Anvil International: www.anvilintl.com/#sle.
2. Apollo Valves: www.apollovalves.com/#sle.
3. Grinnell Products: www.grinnell.com/#sle.
4. Uponor, Inc: www.uponorengineering.com/#sle.
5. Viega
6. Victaulic

B Construction, 4 inch and Smaller: MSS SP-110, Class 150, 600 psi CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded or grooved ends with union.

2.8 FLOW-BALANCING VALVES

A Manufacturers:
1. Griswold Controls: www.griswoldcontrols.com/#sle.
2. ITT Bell & Gossett: www.bellgossett.com/#sle.

B Construction: Class 125, Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet, blowdown/backflush drain.

C Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure 3.5 psi.

2.9 STRAINERS

A Size 1/2 inch to 3 inch:
1. Class 150, threaded forged bronze Y-pattern body, stainless steel perforated mesh screen with cap, and rated for 150 psi, 250 deg F WOG service.

B Size 2 inch and Smaller:
1. Threaded brass body for 175 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.
2. Class 150, threaded bronze body 300 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.

C Size 1-1/2 inch to 4 inch:
1. Class 125, flanged iron body, Y pattern with 1/16 inch stainless steel perforated screen.

PART 3 EXECUTION

3.1 EXAMINATION

A Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B Remove scale and dirt, on inside and outside, before assembly.

C Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

A Install in accordance with manufacturer's instructions.

B Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

C Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.

D PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.

E Sleeve pipes passing through partitions, walls, and floors.

F Inserts:
1. Provide inserts for placement in concrete formwork.

G Pipe Hangers and Supports:
1. Install in accordance with ASME B31.9.
2. Support horizontal piping as indicated.
3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
4. Place hangers within 12 inches of each horizontal elbow.
5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
8. Provide copper plated hangers and supports for copper piping.
9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

H When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

3.4 APPLICATION

A Use grooved mechanical couplings and fasteners only in accessible locations.

B Install unions downstream of valves and at equipment or apparatus connections.

C Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

D Install ball or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers.

E Install globe valves for throttling, bypass, or manual flow control services.

F Provide lug end butterfly valves adjacent to equipment when provided to isolate equipment.

G Provide spring-loaded check valves on discharge of water pumps.

H Provide flow controls in water recirculating systems where indicated.

3.5 TOLERANCES

A Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope.

B Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.6 FIELD TESTS AND INSPECTIONS

A Verify and inspect systems according to requirements by the Authority Having Jurisdiction. In the absence of specific test and inspection procedures proceed as indicated below.

B Domestic Water Systems:
1. Perform hydrostatic testing for leakage prior to system disinfection.
2. Test Preparation: Close each fixture valve or disconnect and cap each connected fixture.
3. General:
a. Fill the system with water and raise static head to 10 psi above service pressure. Minimum static head of 50 to 150 psi. As an exception, certain codes allow a maximum static pressure of 80 psi.

C Test Results: Document and certify successful results, otherwise repair, document, and retest.

3.7 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A Prior to starting work, verify system is complete, flushed, and clean and complys with local regulations.

B Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

C Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.

D Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

E Maintain disinfectant in system for 24 hours.

F If final disinfectant residual tests less than 25 mg/L, repeat treatment.

G Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

H Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.8 SERVICE CONNECTIONS

A Provide new sanitary sewer services. Before commencing work, check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

B Provide new water service complete with approved double check backflow preventer and water meter with by-pass valves, pressure reducing valve, and sand strainer.
1. Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Calk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.
2. Provide 18 gauge, 0.0478-inch galvanized sheet metal sleeve around service main to 2 inch above floor and 6 feet minimum below grade. Size for minimum of 2 inches of loose batt insulation stuffing.

END OF SECTION

SECTION 221006
PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A Drains.
B Cleanouts.
C Washing machine outlet boxes.
D Water hammer arrestors.
E Combination Waste and Vent Systems

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

A ASME A112.6.3 - Floor Drains; 2022.
B NSF 61 - Drinking Water System Components - Health Effects; 2024.
C NSF 372 - Drinking Water System Components - Lead Content; 2024.
D PDI-WH 201 - Water Hammer Arresters; 2017.

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.
B Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
C Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.
D Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.

1.5 QUALITY ASSURANCE

A Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.2 DRAINS

A Manufacturers:
1. Jay R. Smith Manufacturing Company: www.jrsmith.com/#sle.
2. Josam Company: www.josam.com/#sle.
3. MIFAB, Inc: www.mifab.com/#sle.
4. Sioux Chief
5. Watts
6. Zurn Industries, LLC: www.zurn.com/#sle.

B Floor Drains:
1. Manufacturers:
a. Jay R. Smith Manufacturing Company: www.jrsmith.com/#sle.
b. MIFAB, Inc; FS1100-C Series: www.mifab.com/#sle.
c. Sioux Chief
d. Watts
e. Zurn Industries, LLC; Z415-BZ1: www.zurn.com/#sle.

C Floor Drain:
1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.

D Floor Drain:
1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable square nickel bronze strainer with removable perforated sediment bucket.

E Floor Sink (FS-1):
1. Acid Resistant Lacquered cast iron body with dome strainer and seepage flange.
2. Top Grate Material: Cast Iron
3. Top Grate Finish: Acid Resistant enamal or NB as per schedule
4. Top Shape: Square

2.3 CLEANOUTS

A Manufacturers:
1. Jay R. Smith Manufacturing Company: www.jrsmith.com/#sle.
2. Josam Company: www.josam.com/#sle.
3. MIFAB, Inc: www.mifab.com/#sle.
4. Sioux Chief
5. Watts
6. Zurn Industries, LLC: www.zurn.com/#sle.Wa

B Cleanouts at Exterior Surfaced Areas:
1. Round cast nickel bronze access frame and non-skid cover.

C Cleanouts at Exterior Unsurfaced Areas:
1. Line type with lacquered cast iron body and round epoxy coated gasketed cover.

D Cleanouts at Interior Finished Floor Areas:
1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.

2.4 WASHING MACHINE OUTLET BOXES

A Manufacturers:
1. Oatey
2. Zurn Industries, LLC: www.zurn.com/#sle.
3. _____.
4. Guy Grey

B Description: Plastic preformed rough-in box with brass quarter-turn ball valves or single lever-handle valves, socket for 2 inch waste, and slip-in finishing cover.

C Accessories:
1. Water-hammer arrestors.
2. Support brackets for installation between framing studs.

2.5 WATER HAMMER ARRESTORS

A Manufacturers:
1. Jay R. Smith Manufacturing Company: www.jrsmith.com/#sle.
2. Watts Regulator Company, a part of Watts Water Technologies: www.wattsregulator.com/#sle.
3. Zurn Industries, LLC: www.zurn.com/#sle.

B Water Hammer Arrestors:
1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range 34 to 250 degrees F and maximum 150 psi working pressure.

PART 3 EXECUTION

3.1 INSTALLATION

A Install in accordance with manufacturer's instructions.
B Encase exterior cleanouts in concrete flush with grade.
C Install floor cleanouts at elevation to accommodate finished floor.
D Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to Flush Valves.

END OF SECTION

SECTION 223000
PLUMBING EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A Commercial gas-fired water heaters.
B Diaphragm-type compression tanks.
C Acid-effluent neutralizers.
D In-line circulator pumps.
E Domestic Hot Water Recirculation Valves

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

A ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
B ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2023, with Errata (2024).

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittals procedures.
B Product Data:
1. Product Data: Provide manufacturer's literature and data sheets for each product. Include information on materials of fabrication, assembly of components, dimensions, weights, capabilities, performance, electrical characteristics, location and sizes of connections, service and access locations, and manufacturer-provided and field-installed accessories.
C Shop Drawings:
1. Provide plans and elevations showing equipment assembly, including fabrication and installation details. Show location and sizes of connections.
2. Indicate clearances required for service, access, maintenance, and replacement of internal components.
D Manufacturer's Instructions: Indicate installation instructions.
E Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
F Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A Certifications:
1. Water Heaters: NSF approved.

1.6 DELIVERY, STORAGE, AND HANDLING

A Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.7 WARRANTY

A See Section 017800 - Closeout Submittals for additional warranty requirements.
B Manufacturer Warranty: Provide 15 year manufacturer warranty for commercial gas fired water heaters. Complete forms in Owner's name and register with manufacturer.
C Manufacturer Warranty: Provide 5-year manufacturer warranty for domestic water heaters and water storage tanks. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 WATER HEATERS

A Manufacturers:
1. A.O. Smith Water Products Co: www.hotwater.com/#sle.
2. Bock Water Heaters, Inc: www.bockwaterheaters.com/#sle.
3. Bradford White Corporation: www.bradfordwhite.com/#sle.
4. Hubbell
5. Lochinvar
6. PVI
7. Rheem Manufacturing Company: www.rheem.com/#sle.
8. State Water Heaters

B Commercial Gas-Fired Water Heaters:
1. Manufacturers:
a. PVI Conquest: Basis of Design for Aquaplex Tanks
b. Hubble: GSE Basis of Design for Cement Lined Tanks
c. AO Smith BTH - Basis of Design for glass lined Tanks
2. Type: Automatic, natural gas-fired, vertical storage.
3. Minimum Efficiency Required: ASHRAE Std 90.1 I-P.
4. Performance: See Drawing Schedule
5. **AquaPlex Tank**: combustion chamber and fire tubes will be constructed from phase-balanced austenitic and ferritic duplex steel with a chemical structure containing a minimum of 21% chromium to prevent corrosion and mill certified per ASTM A 923Methods A to ensure that the product is free of detrimental chemical precipitation that affects corrosion resistance. The material selected shall be tested and certified to pass stress chloride cracking test protocols as defined in ISO 3651-2and ASTM G123 - 00(2005) "Standard Test Method for Evaluating Stress-Corrosion Cracking of Stainless Alloys with Different Nickel Content in Boiling Acidified Sodium Chloride Solution." All internal and external tank surfaces shall undergo full immersion passivation and pickling processing to meet critical temperature, duration and chemical concentration controls required to complete corrosion resistance restoration of pressure vessel surfaces. Other passivation and pickling methods are not accepted. Immersion passivation and pickling certification documents are required and shall be provided with each product.
6. Burner: Combustion will be provided by a premix, fan-assisted surface burner with a gas train meeting UL, ANSI and FM standards for the input specified.
7. Gas Train: Gas train components will capable of self-proportionating gas and air to maintain optimum combustion in response to varying vent pressures
8. Water heater will be a category IV, condensing appliance and vent through Polypropylene, or A29 stainless steel. Water heater will satisfy requirements for sealed combustion. Vents for inlet air and exhaust can terminate in different pressure zones. Concetric Vent kits not allowed.
9. Intake Air piping shall be Polypropylene.
10. Accessories:
a. Water Connections: Brass.
b. Dip Tube: Brass.
c. Drain valve.
d. Anode: Magnesium on non PVI Water and Hubbel Heaters
e. Temperature and Pressure Relief Valve: ASME labeled.
f. Provide Dielectric connection as per manufacturer requirements.
g. Provide Acit Neutralization Kit
11. Applications:
a. Automatic storage water heater.
b. Automatic circulating tank water heater.
c. For operation on combustible floors.
12. Controls: Automatic water thermostat with temperature range adjustable from 120 to 180 degrees F, automatic reset high temperature limiting thermostat factory set at 195 degrees F, gas pressure regulator, multi-ribbon or tubular burner, 100 percent safety shut-off pilot and thermocouple, flue baffle and draft hood.

2.2 DIAPHRAGM-TYPE COMPRESSION TANKS

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A Manufacturers:
1. Amtrol Inc: www.amtrol.com/#sle.
2. Bell & Gossett, a brand of Xylem, Inc: www.bellgossett.com/#sle.
3. Taco, Inc: www.taco-hvac.com/#sle.

B Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, rated for working pressure of 125 psig, with flexible EPDM diaphragm sealed into tank, and steel legs or saddles.

C Accessories: Pressure gauge and air-charging fitting, tank drain; precharge to 12 psig.

D Size
1. Provide the following sizes for each water heater tanks unless noted otherwise.
a. Systems with water heaters less that 60 gallson. Provide Amtrol ST-5
b. System with water heater tanks greater or equal to 60 gallons provide ST-12

2.3 ACID-EFFLUENT NEUTRALIZERS

A Basis of Design: Axiom NC-1 or equal

B Performance:
1. Maximum Low pH Water Flow Rate: 1.6 gpm.
2. Media consists of limestone mineral media.

C Mineral Tank: Glass fiber reinforced tank.
1. Size: 4 inches diameter, 13 inches.
2. Weight: 4.5 lbs

2.4 IN-LINE CIRCULATOR PUMPS

A Manufacturers:
1. Armstrong Fluid Technology: www.armstrongfluidtechnology.com/#sle.
2. Bell & Gossett, a brand of Xylem, Inc: www.bellgossett.com/#sle.

B Casing: Bronze, rated for 125 psig working pressure, with stainless steel rotor assembly.

C Impeller: Bronze.

D Shaft: Alloy steel with integral thrust collar and two oil lubricated bronze sleeve bearings.

E Seal: Carbon rotating against a stationary ceramic seat.

F Drive: Flexible coupling.

PART 3 EXECUTION

3.1 INSTALLATION

A Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions required for applicable certifications.

B Coordinate system, equipment, and piping work with applicable electrical, fuel, gas, vent, drain, and waste support interconnections as included or provided by other trades.

C Domestic Hot Water Storage Tanks:
1. Provide steel pipe support, independent of building structural framing members.
2. Clean and flush prior to delivery to site. Seal until pipe connections are made.

D Pumps:
1. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

3.2 FIELD QUALITY CONTROL

A See Section 014000 - Quality Requirements for additional requirements.

3.3 SCHEDULES - SEE DRAWINGS

END OF SECTION

SECTION 224000
PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A Flush valve water closets.
B Wall hung urinals.
C Lavatories.
D Sinks.
E Under-lavatory pipe supply covers.
F Showers.
G Service sinks.
H Emergency eye and face wash.
I Emergency showers.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

A ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).

C ASME A112.18.1 - Plumbing Supply Fittings; 2018, with Errata.

D ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011 (Reaffirmed 2022).

E ASME A112.19.2 - Ceramic Plumbing Fixtures; 2018, with Errata.

F ASME A112.19.3 - Stainless Steel Plumbing Fixtures; 2022.

G ASME A112.19.1 - Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures; 2024.

H ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2022.

I ASSE 1014 - Performance Requirements for Backflow Prevention Devices for Hand-Held Showers; 2020.

J ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices; 2020.

K ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory Piping; 2021.

L ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

M NSF 61 - Drinking Water System Components - Health Effects; 2024.

N NSF 372 - Drinking Water System Components - Lead Content; 2024.

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.

B Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

C Manufacturer's Instructions: Indicate installation methods and procedures.

D Maintenance Data: Include fixture trim exploded view and replacement parts lists.

E Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

F Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

1.5 QUALITY ASSURANCE

A Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A Accept fixtures on-site in factory packaging. Inspect for damage.

B Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.7 WARRANTY

A See Section 017800 - Closeout Submittals for additional warranty requirements.

B Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.2 REGULATORY REQUIREMENTS

A Comply with applicable codes for installation of plumbing systems.

B Perform work in accordance with local health department regulations.

2.3 FLUSH VALVE WATER CLOSETS

A Water Closets:
1. Vitreous china, ASME A112.19.2, wall hung, siphon jet flush action, china bolt caps.
2. Bowl: ASME A112.19.2; 16.5 inches high with elongated rim.
3. Flush Valve: Exposed (top spud).
4. Flush Operation: Manual, oscillating handle.
5. Handle Height: 44 inches or less.
6. Inlet Size: 1-1/2 inches.
7. Trapway Outlet: 4 inch.
8. Color: White.
9. Manufacturers:
a. American Standard, Inc: www.americanstandard-us.com/#sle.
b. Kohler Company:
c. Zurn Industries, LLC:.
d. Substitutions: See Section 016000 - Product Requirements.

B Flush Valves:
1. Valve Supply Size: 1 inch.
2. Valve Outlet Size: 1-1/2 inches.
3. Manufacturers:
a. Sloan Valve Company: Manual Series Royal 111
b. Sloan Valve Company: Sensor Operated (Battery/AC) Royal 8111-ESS-TMO
c. Zurn Industries, LLC:
d. Hyrdotek - 8000 Series (Sensor Battery/AC)
4. Manual Operated:
a. Type: ASME A112.18.1 or ASME A112.19.5; diaphragm type complete with vacuum breaker stops, and accessories.
b. Supplied Volume Capacity: 1.6 gal per flush.

C Toilet Seats:
1. Manufacturers:
a. American Standard, Inc:
b. Bemis Manufacturing Company
c. Centoco
d. Church Seat Company:
e. Olsonite:
f. Zurn Industries, LLC:
g. Substitutions: See Section 016000 - Product Requirements.
2. Plastic: Solid, white finish, enlongated shape, open front, slow-closing hinged seat cover, and brass bolts with covers.
3. Plastic: Black finish, open front, extended back, self-sustaining hinge, brass bolts, with cover.

D Water Closet Carriers:
1. Manufacturers:
a. Jay R. Smith Manufacturing Company:
b. JOSAM Company:
c. Watts
d. Zurn Industries, LLC:
2. ASME A112.6.1M; adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

2.4 WALL HUNG URINALS

A Manufacturers:
1. American Standard, Inc: www.americanstandard-us.com/#sle.
2. Kohler Company: www.kohler.com/#sle.
3. Zurn Industries, LLC: www.zurn.com/#sle.
4. Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

B Vitreous china, ASME A112.19.2, wall hung with side shields and concealed carrier.
1. Consumption Volume: 1.0 gal per flush, maximum.
2. Flush Style: Washout.
3. Flush Valve: Exposed (top spud).
4. Flush Operation: Sensor operated.
5. Trapway Outlet: Integral.
6. Removable stainless steel strainer.
7. Supply Size: 3/4 inch.
8. Outlet Size and Location: 2 inches, bottom side.

C Flush Valves:
1. Manufacturers:
a. American Standard, Inc: www.americanstandard-us.com/#sle.
b. Hydrotek HX-8000XX Series
c. Sloan Valve Company: www.sloanvalve.com/#sle. Sloan Royal 8186
d. Zurn Industries, LLC; ZEMS Series: www.zurn.com/#sle.
e. _____.
2. Manual Operated: Sloan Royal 111
a. Type: ASME A112.18.1 or ASME A112.19.5; diaphragm type, complete with vacuum breaker stops, and accessories.
b. Supplied Volume Capacity: 1.5 gal per flush.

D Urinal Carriers:
1. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.

2.5 LAVATORIES

A Manufacturers:
1. American Standard, Inc: www.americanstandard-us.com/#sle.
2. Kohler Company: www.kohler.com/#sle.

B Drop-In Basin:
1. Vitreous China: ASME A112.19.2; self-rimming, white, round shape, front overflow, soap depression, seal of putty, caulking, or concealed vinyl gasket, and white finish. Size as indicated on drawings with 4-inch centerset spacing.

C Supply Faucet:
1. Deck Mounted Faucet Manufacturers:
a. American Standard, Inc: www.americanstandard-us.com/#sle.
b. Chicago
c. Hydrotek
d. Kohler Company: www.kohler.com/#sle.
e. Sloan
2. ASME A112.18.1; chrome plated combination supply fitting with pop-up waste, water economy aerator with maximum flow of 2.2 gpm, indexed handles.

D Manual Operated - Integral 1070
1. Chicago 410-T41E64VPABCP (Basis of Design)
2. Single-Lever Handle, Supply Faucet: ASME A112.18.1; deck-mount, ceramic cartridge disc valve, and maximum flow of 1.2 gpm.

E Thermostatic Mixing Valve:
1. ASSE 1070 listed with combination stop, strainer, and check valves, and flexible stainless steel connectors.

F Accessories:
1. Chrome plated 17 gauge, 0.0538 inch brass P-trap and arm with escutcheon.
2. Offset waste with perforated open strainer.
3. Combination stop and strainer.
4. Screwdriver stops.
5. Rigid supplies.

2.6 SINKS

A Manufacturers:
1. American Standard, Inc: www.americanstandard-us.com/#sle.
2. Jay R. Smith Manufacturing Company: www.jrsmith.com/#sle.
3. Kohler Company: www.kohler.com/#sle.
4. Just / Elkay.

B Double Compartment Bowl:
1. ASME A112.19.3; See Drawing Schedule for outside dimensions, 18 gauge, 0.050 inch thick, type 304 stainless steel, self rimming and undercouated, with ledge drilled for trim.
2. Drain: 3-1/2 inch crumb cup and tailpiece.
3. Sound Deadening - Bottom Pads

C Kitchen Faucets:
1. Manufacturers:
a. American Standard, Inc: www.americanstandard-us.com/#sle.
b. Chicago
c. Elkay.
2. Single Handle Faucet with Three-Function Pullout Spray Head:
a. Minimum Spout Height: 8 inch.
b. Minimum Spout Reach: 8-1/2 inch.
c. Type: Deck-mount, swivel faucet with mounting plate.
d. Spray Functions: Stream, full spray and pause at 1.8 gpm, maximum.
e. ASME A112.18.1, ADA Standards, and NSF 61 compliant assembly.
f. Materials: Ceramic disc-cartridge valve on brass body with polished chrome finish.

D Accessories: Provide braided water supply lines, slip-joint p-trap, stainless steel basket strainer, and ASSE 107 Mixing valve where required..

2.7 UNDER-LAVATORY PIPE SUPPLY COVERS

A Manufacturers:
1. Plumberex Specialty Products, Inc: www.plumberex.com/#sle.

B Basis of Design: Plumberex Specialty Products, Inc; www.plumberex.com/#sle.
1. Under-Lavatory Covers with Snap-Lock Fasteners (Molded): Plumberex Pro-Extreme.

C General:
1. Insulate exposed drainage piping including hot, cold and tempered water supplies under lavatories or sinks per ADA Standards.
2. Construction: 1/8 inch PVC with antimicrobial, antifungal and UV resistant properties.
a. Comply with ASTM C1822 Type III for covers on accessible lavatory piping.
b. Comply with ASME A112.18.9 for covers on accessible lavatory piping.
c. Comply with ICC A117.1.
3. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces. No cable ties allowed.

2.8 SHOWERS

A Cabinet: ASME A112.19.1; porcelain enamelled steel, 36" by 36" by 75" with stone texture receptor, soap dish, removable chrome-plated strainer, tail piece, _____ color.

B Shower Trim:
1. Single Handle: ASME A112.18.1; lever-handle operated, pressure balanced mixing valve with integral service stops, bent shower arm with adjustable spray ball joint shower head with maximum flow, and escutcheon.

C Wall Mounted Shower Valve:
1. Comply with ASME A112.18.1.
2. Provide two-handle, in-wall diverter valve body with integral thermostatic mixing valve to supply 1.5 gpm.

D Shower Head:
1. ASME A112.18.1; chrome-plated vandal-proof institutional head with integral wall bracket, built-in 2.5 gpm flow control.

E Hand-Held Shower Head:
1. ASME A112.18.1, adjustable spray hand-held shower head with swivel fitting with ASSE 1014 backflow preventer.

2.9 SERVICE SINKS

A Manufacturers:
1. FIAT.

B Self-Standing, Single-Bowl, Utility Sink: Two-hole, , stainless steel, with fitted drain and stopper. Size as indicated on drawings.

C Single-Lever Handle Service Faucet:
1. Type: Sink mounted faucet with union inlets and mounting plate.
2. Spray Type: Full stream spray at 1.8 gpm, maximum.
3. See sink schedule for further information on faucet requirements.
4. Materials: Ceramic disc cartridge valve on brass body with polished chrome finish.
5. Products:
a. Chicago. 527-317ABCP
b. Fiat A1000 Faucet

D Accessories:
1. P-trap

2.10 EMERGENCY EYE AND FACE WASH

A Manufacturers:
1. Haws Corporation: www.hawsco.com/#sle.
2. Stingray.

B Emergency Wash: ANSI Z358.1; wall-mounted, self-cleaning, nonclogging eye and face wash with quick opening, full-flow valves, stainless steel eye and face wash receptor, twin eye wash heads and face spray ring, stainless steel dust cover, copper alloy control valve and fittings.

C Regulated flow of 3gpm measured at 30 psi.

D Intergral Thermostatic Mixing Valve: Thermostatic mixing valve, ASSE 1070 listed, with combination stop, strainer, and check valves, and flexible stainless steel connectors.

E Intergral Thermometer

2.11 EMERGENCY SHOWERS

A Manufacturers:
1. Haws Corporation: www.hawsco.com/#sle.
2. Therm-Omega-Tech, Inc: www.thermomegatech.com/#sle.
3. Stingray.

B Emergency Shower: ANSI Z358.1; wall-mounted, self-cleaning, nonclogging 8 inch diameter stainless steel deluge shower head with elbow, one inch full flow valve with pull chain and 8 inch diameter ring, one inch interconnecting fittings.

C Integral Thermostatic Mixing Valve: Thermostatic mixing valve, ASSE 1070 listed, with combination stop, strainer, and check valves, and flexible stainless steel connectors.

D Intergral Thermometer

PART 3 EXECUTION

3.1 EXAMINATION

A Verify that walls and floor finishes are prepared and ready for installation of fixtures.

3.2 PREPARATION

A Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

A Install each fixture with trap, easily removable for servicing and cleaning.

B Provide chrome-plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

C Install components level and plumb.

D Install and secure fixtures in place with wall supports and bolts.

E Solidly attach water closets to floor with lag screws. Lead flashing is not intended to hold fixture in place.

3.4 INTERFACE WITH WORK OF OTHER SECTIONS

A Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

A Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

A Clean plumbing fixtures and equipment.

3.7 PROTECTION

A Protect installed products from damage due to subsequent construction operations.

B Do not permit use of fixtures by construction personnel.

C Repair or replace damaged products before Date of Substantial Completion.

3.8 SCHEDULES

A Fixture Rough-In
1. Water Closet (Flush Valve Type):
a. Cold Water: 1 Inch.
b. Waste: 4 Inch.
c. Vent: 2 Inch.
2. Urinal (Flush Valve Type):
a. Cold Water: 3/4 Inch.
b. Waste: 2 Inch.
c. Vent: 1-1/2 Inch.
3. Lavatory:
a. Hot Water: 1/2 Inch.
b. Cold Water: 1/2 Inch.
c. Waste: 1-1/2 Inch.
d. Vent: 1-1/4 Inch.
4. Sink:
a. Hot Water: 1/2 Inch.
b. Cold Water: 1/2 Inch.
c. Waste: 1-1/2 Inch.
d. Vent: 1-1/4 Inch.
5. Service Sink:
a. Hot Water: 1/2 Inch.
b. Cold Water: 1/2 Inch.
c. Waste: 3 Inch.
d. Vent: 1-1/2 Inch.
6. Shower:

END OF SECTION

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DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

SECTION 230500

BASIC HVAC REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A All materials and installation methods shall conform to the applicable standards, guidelines and codes referenced in the specification sections throughout the project manual.

1.2 DEFINITIONS

A Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.

E Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene monomer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

G Where used in mechanical documents, the word "furnish" shall mean supply for use, the word "install" shall mean connect complete and ready for operation, and the word "provide" shall mean to supply for use and connect complete and ready for operation.

1. Any item listed as furnished shall also be installed, unless otherwise noted.
2. Any item listed as installed shall also be furnished, unless otherwise noted.

1.3 QUALITY ASSURANCE

A Contractor's Responsibility Prior to Submitting Pricing Data:

1. The Contractor is responsible for constructing complete and operating systems. The Contractor acknowledges and understands that the Contract Documents are a two-dimensional representation of a three-dimensional object, subject to human interpretation. This representation may include imperfect data, interpreted codes, utility guidelines, three-dimensional conflicts, and required field coordination items. Such deficiencies can be corrected when identified prior to ordering material and starting installation. The Contractor agrees to carefully study and compare the individual Contract Documents and report at once in writing to the Design Team any deficiencies the Contractor may discover. The Contractor further agrees to require each subcontractor to likewise study the documents and report at once any deficiencies discovered.
2. The Contractor shall resolve all reported deficiencies with the Architect/Engineer prior to awarding any subcontracts, ordering material, or starting any work with the Contractor's own employees. Any work performed prior to receipt of instructions from the Design Team will be done at the Contractor's risk.

B Qualifications:

1. Only products of reputable manufacturers are acceptable.
2. All Contractors and subcontractors shall employ only workers skilled in their trades.

C Compliance with Codes, Laws, Ordinances:

1. Conform to all requirements of the Codes, Laws, Ordinances and other regulations having jurisdiction.
2. Conform to all State Codes.
3. If there is a discrepancy between the codes and regulations and these specifications, the Architect/Engineer shall determine the method or equipment used.
4. If the Contractor notes, at the time of bidding, any parts of the drawings or specifications that do not comply with the codes or regulations, he shall inform the Architect/Engineer in writing, requesting a clarification. If there is insufficient time for this procedure, he shall submit with his proposal a separate price to make the system comply with the codes and regulations.
5. All changes to the system made after letting of the contract, to comply with codes or requirements of Inspectors, shall be made by the Contractor without cost to the Owner.
6. If there is a discrepancy between manufacturer's recommendations and these specifications, the manufacturer's recommendations shall govern.

D Permits, Fees, Taxes, Inspections:

1. Procure all applicable permits and licenses.
2. Abide by all laws, regulations, ordinances, and other rules of the State or Political Subdivision where the work is done, or as required by any duly constituted public authority.
3. It is the sole responsiblity of the contractor to obtain and procure permits. The Engineer is not lialble for any costs associated with the cost of permits or delays associated with permitting or obtaining permits under this division. The engineer at times may submit the permit in advance to help with project timeline. However, this fact does not relieve the installing contractor(s) from tracking and ensuring permitting processs is being completed.
4. Pay all charges for permits or licenses.
5. Pay all fees and taxes imposed by the State, Municipal and/or other regulatory bodies.
6. Pay all charges arising out of required inspections by an authorized body.
7. Pay all charges arising out of required contract document reviews associated with the project and as initiated by the Owner or authorized agency/consultant.
8. Where applicable, all fixtures, equipment and materials shall be approved or listed by Underwriter's Laboratories, Inc.

E Utility Company Requirements:

1. Secure from the appropriate private or public utility company all applicable requirements.
2. Comply with all utility company requirements.
3. Make application for and pay for service connections, such as gas.
4. Make application for and pay for all meters and metering systems required by the utility company.

F Examination of Drawings:

1. The drawings for the mechanical work are completely diagrammatic, intended to convey the scope of the work and to indicate the general arrangements and locations of equipment, outlets, etc., and the approximate sizes of equipment.
2. Contractor shall determine the exact locations of equipment and rough-ins, and the exact routing of pipes and ducts to best fit the layout of the job.
3. Scaling of the drawings is not sufficient or accurate for determining these locations.
4. Where job conditions require reasonable changes in indicated arrangements and locations, such changes shall be made by the Contractor at no additional cost to the Owner.
5. Because of the scale of the drawings, certain basic items, such as fittings, boxes, valves, unions, etc., may not be shown, but where required by other sections of the specifications or required for proper installation of the work, such items shall be furnished and installed.
6. If an item is either on the drawings or in the specifications, it shall be included in this contract.
7. Determination of quantities of material and equipment required shall be made by the Contractor from the documents. Where discrepancies arise between drawings, schedules and/or specifications, the greater number shall govern.
8. Where used in mechanical documents, the word "furnish" shall mean supply for use, the word "install" shall mean connect complete and ready for operation, and the word "provide" shall mean to supply for use and connect complete and ready for operation.
   a. Any item listed as furnished shall also be installed, unless otherwise noted.
   b. Any item listed as installed shall also be furnished, unless otherwise noted.

G Field Measurements:

1. Verify all pertinent dimensions at the job site before ordering any materials or fabricating any supports, pipes or ducts.

H Electronic Media/Files:

1. Construction drawings for this project have been prepared utilizing Revit or Cadd platforms
2. Contractors and Subcontractors may request electronic media files of the contract drawings and/or copies of the specifications. Specifications will be provided in PDF format.
3. Upon request for electronic media, the Contractor shall complete and return a signed "Electronic File Transmittal" form provided by Engineer.
4. If the information requested includes floor plans prepared by others, the Contractor will be responsible for obtaining approval from the appropriate Design Professional for use of that part of the document.
5. The electronic contract documents can be used for preparation of shop drawings and as-built drawings only. The information may not be used in whole or in part for any other project.
6. The drawings prepared by Engineer for bidding purposes may not be used directly for ductwork layout drawings or coordination drawings.
7. The use of these CAD documents by the Contractor does not relieve them from their responsibility for coordination of work with other trades and verification of space available for the installation.
8. The information is provided to expedite the project and assist the Contractor with no guarantee by Engineer as to the accuracy or correctness of the information provided. Engineer accepts no responsibility or liability for the Contractor's use of these documents.
9. Electrical Characteristics for Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.4 SUBMITTALS

A Submittals shall be required for the following items, and for additional items where required elsewhere in the specifications or on the drawings.

B General Submittal Procedures: The following are required:

1. Transmittal: Each transmittal shall include the following:
   a. Date
   b. Project title and number
   c. Contractor's name and address
   d. Division of work (e.g., plumbing, heating, ventilating, etc.)
   e. Description of items submitted and relevant specification number
   f. Notations of deviations from the contract documents
   g. Other pertinent data
2. Submittal Cover Sheet: Each submittal shall include a cover sheet containing:
   a. Date
   b. Project title and number
   c. Architect/Engineer
   d. Contractor and subcontractors' names and addresses
   e. Supplier and manufacturer's names and addresses
   f. Division of work (e.g., plumbing, heating, ventilating, etc.)
   g. Description of item submitted (using project nomenclature) and relevant specification number
   h. Notations of deviations from the contract documents
   i. Other pertinent data
   j. Provide space for Contractor's review stamps
3. Composition:
   a. Submittals shall be submitted using specification sections and the project nomenclature for each item.
   b. Individual submittal packages shall be prepared for items in each specification section. All items within a single specification section shall be packaged together where possible. An individual submittal may contain items from multiple specifications sections if the items are intimately linked (e.g., pumps and motors).
   c. All sets shall contain an index of the items enclosed with a general topic description on the cover.
4. Content: Submittals shall include all fabrication, erection, layout, and setting drawings; manufacturers' standard drawings; schedules; descriptive literature, catalogs and brochures; performance and test data; wiring and control diagrams; dimensions; shipping and operating weights; shipping splits; service clearances; and all other drawings and descriptive data of materials of construction as may be required to show that the materials, equipment or systems and the location thereof conform to the requirements of the contract documents.
5. Contractor's Approval Stamp:
   a. The Contractor shall thoroughly review and approve all shop drawings before submitting them to the Architect/Engineer. The Contractor shall stamp, date and sign each submittal certifying it has been reviewed.
   b. Unstamped submittals will be rejected.
   c. The Contractor's review shall include, but not be limited to, verification of the following:
      1) Only approved manufacturers are used.
      2) Addenda items have been incorporated.
      3) Catalog numbers and options match those specified.
      4) Performance data matches that specified.
      5) Electrical characteristics and loads match those specified.
      6) Equipment connection locations, sizes, capacities, etc. have been coordinated with other affected trades.
      7) Dimensions and service clearances are suitable for the intended location.
      8) Equipment dimensions are coordinated with support steel, housekeeping pads, openings, etc.
      9) Constructability issues are resolved (e.g., weights and dimensions are suitable for getting the item into the building and into place, sinks fit into countertops, etc.).
   d. The Contractor shall review, stamp and approve all subcontractors' submittals as described above.
   e. The Contractor's approval stamp is required on all submittals. Approval will indicate the Contractor's review of all material and a complete understanding of exactly what is to be furnished. Contractor shall clearly mark all deviations from the contract documents on all submittals. If deviations are not marked by the Contractor, then the item shall be required to meet all drawing and specification requirements.
6. Submittal Identification and Markings:
   a. The Contractor shall clearly mark each item with the same nomenclature applied on the drawings or in the specifications.
   b. The Contractor shall clearly indicate the size, finish, material, etc.
   c. Where more than one model is shown on a manufacturer's sheet, the Contractor shall clearly indicate exactly which item and which data is intended.
   d. All marks and identifications on the submittals shall be unambiguous.
7. Schedule submittals to expedite the project. Coordinate submission of related items.
8. Identify variations from the contract documents and product or system limitations that may be detrimental to the successful performance of the completed work.
9. Reproduction of contract documents alone is not acceptable for submittals.
10. Incomplete submittals will be rejected without review. Partial submittals will only be reviewed with prior approval from the Architect/Engineer.
11. Submittals not required by the contract documents may be returned without review.
12. The Architect/Engineer's responsibility shall be to review one set of shop drawing submittals for each product. If the first submittal is incomplete or does not comply with the drawings and/or specifications, the Contractor shall be responsible to bear the cost for the Architect/Engineer to recheck and handle the additional shop drawing submittals.
13. Submittals shall be reviewed and approved by the Architect/Engineer before releasing any equipment for manufacture or shipment.
14. Contractor's responsibility for errors, omissions or deviation from the contract documents in submittals is not relieved by the Architect/Engineer's approval.

C Electronic Submittal Procedures:

1. Distribution: Email submittals as attachments to all parties designated by the Architect/Engineer, unless a web-based submittal program is used.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
   a. Submittal file name: 2025-101SD 23 XX XX description.pdf
5. File Size: Electronic file size shall be limited to a maximum of 10MB. Larger files shall be transmitted via a pre-approved method.

1.5 CHANGE ORDERS

A A detailed material and labor takeoff shall be prepared for each change order, along with labor rates and markup percentages. Change orders with inadequate breakdown will be rejected.

B Change order work shall not proceed until authorized.

1.6 EQUIPMENT SUPPLIERS' INSPECTION

A The following equipment shall not be placed in operation until a competent installation and service representative of the manufacturer has inspected the installation and certified that the equipment is properly installed, adjusted and lubricated; that preliminary operating instructions have been given; and that the equipment is ready for operation:

1. Base Mounted Pumps
2. Boilers, Burners and Boiler Trim
3. Water Chillers, Fluid Coolers, Central Heat Pumps

B Contractor shall arrange for and obtain supplier's on-site inspection(s) at proper time(s) to assure each phase of equipment installation and/or connection is in accordance with the manufacturer's instructions.

C Submit copies of start-up reports to the Architect/Engineer and include copies of Owner's Operation and Maintenance Manuals.

1.7 PRODUCT DELIVERY, STORAGE, HANDLING & MAINTENANCE

A Exercise care in transporting and handling to avoid damage to materials. Store materials on the site to prevent damage. Keep materials clean, dry and free from harmful conditions. Immediately remove any materials that become wet or that are suspected of becoming contaminated with mold or other organisms.

B Coordinate the installation of heavy and large equipment with the Construction Manager or General Contractor. If the Mechanical Contractor does not have prior documented experience in rigging and lifting similar equipment, he/she shall contract with a qualified lifting and rigging service that has similar documented experience. Follow all equipment lifting and support guidelines for handling and moving.

C Contractor is responsible for moving equipment into the building and/or site. Contractor shall review site prior to bid for path locations and any required building modifications to allow movement of equipment. Contractor shall coordinate his/her work with other trades.

1.8 WARRANTY

A Provide one-year warranty, unless otherwise noted, to the Owner for all fixtures, equipment, materials, and workmanship from date of substantial completion.

B Provide 24 month warranty, unless otherwise noted, to the owner for all pumps, boilers, controllers, chillers, condensing units to ensure units have gone through entire cycle of seasons.

C The warranty period for all work in this Division of the specifications shall commence on the date of final acceptance, unless a whole or partial system or any separate piece of equipment or component is put into use for the benefit of any party other than the installing contractor with prior written authorization. In this instance, the warranty period shall commence on the date when such whole system, partial system or separate piece of equipment or component is placed in operation and accepted in writing by the Owner.

D Warranty requirements shall extend to correction, without cost to the Owner, of all Work found to be defective or nonconforming to the contract documents. The Contractor shall bear the cost of correcting all damage resulting from defects or nonconformance with contract documents.

1.9 INSURANCE

A Contractor shall maintain insurance coverage of a minimum of 5 Million.

1.10 MATERIAL SUBSTITUTION

A Where several manufacturers' names are given, the manufacturer for which a catalog number is given is the basis for job design and establishes the quality required.

B Equivalent equipment manufactured by the other named manufacturers may be used. Contractor shall ensure that all items submitted by these other manufacturers meet all requirements of the drawings and specifications, and fits in the allocated space.

C Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better than the material, article or equipment identified by the drawings and specifications may be used if approval is secured in writing from the Architect/Engineer not later than ten days prior to the bid opening.

D This Contractor assumes all costs incurred as a result of using the offered material, article or equipment, on his part or on the part of other Contractors whose work is affected.

E This Contractor may list voluntary add or deduct prices for alternate materials on the bid form. These items will not be used in determining the low bidder.

F All material substitutions requested later than ten (10) days prior to bid opening must be listed as voluntary changes on the bid form.

PART 2 PRODUCTS

2.1 NOT APPLICABLE

PART 3 EXECUTION

3.1 JOBSITE SAFETY

A Neither the professional activities of the Architect/Engineer, nor the presence of the Architect/Engineer or his or her employee and subconsultants at a construction site, shall relieve the Contractor and other entity of their obligations, duties and responsibilities including, but not limited to, construction means, methods, sequence, techniques or procedures necessary for performing, superintending or coordinating all portions of the work of construction in accordance with the contract documents and any health or safety precautions required by any regulatory agencies. The Architect/Engineer and his or her personnel have no authority to exercise any control over any construction contractor or other entity or their employees in connection with their work or any health or safety precautions. The Contractor is solely responsible for jobsite safety. The Architect/Engineer and the Architect/Engineer's consultants shall be indemnified and shall be made additional insureds under the Contractor's general liability insurance policy.

3.2 EXCAVATION, FILL, BACKFILL, COMPACTION

A General:

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1. Prior to the commencement of any excavation or digging, the Contractor shall verify all underground utilities with the regional utility locator. Provide prior notice to the locator before excavations. Contact information for most regional utility locaters can be found by calling 811.
2. The Contractor shall do all excavating, filling, backfilling and compacting associated with his work.

B Excavation:
1. Make all excavations to accurate, solid, undisturbed earth, and to proper dimensions.
2. Where excavations are made in error below foundations, concrete of same strength as specified for the foundations or thoroughly compacted sand-gravel fill, as determined by the Architect/Engineer, shall be placed in such excess excavations. Place thoroughly compacted, clean, stable fill in excess excavations under slabs on grade, at the Contractor's expense.
3. Trim bottom and sides of excavations to grades required for foundations.
4. Protect excavations against frost and freezing.
5. Take care in excavating not to damage surrounding structures, equipment or buried pipe. Do not undermine footing or foundation.
6. Perform all trenching in a manner to prevent cave-ins and risk to workmen.
7. Where original surface is pavement or concrete, the surface shall be saw cut to provide clean edges and assist in the surface restoration.
8. Where satisfactory bearing soil for foundations is not found at the indicated levels, the Architect/Engineer or their representative shall be notified immediately, and no further work shall be done until further instructions are given by the Architect/Engineer or their representative.

C Dewatering:
1. Contractor shall furnish, install, operate and remove all dewatering pumps and pipes needed to keep trenches and pits free of water.

D Underground Obstructions:
1. Known underground piping, foundations, and other obstructions in the vicinity of construction are shown on the drawings. Use great care in making installations near underground obstruction.
2. If objects not shown on the drawings are encountered, remove, relocate, or perform extra work as directed by the Architect/Engineer.

E Fill and Backfilling:
1. No rubbish or waste material is permitted for fill or backfill.
2. Provide all necessary sand for backfilling.
3. Dispose of the excess excavated earth as directed.
4. Backfill materials shall be suitable for required compaction, clean and free of perishable materials and stones greater than 4 inches in diameter. Water shall not be permitted to rise in unbackfilled trenches. No material shall be used for backfilling that contains frozen earth, debris or earth with a high void content.
5. Backfill all trenches and excavations immediately after installing pipes, or removal of forms, unless other protection is provided.
6. Around piers and isolated foundations and structures, backfill and fill shall be placed and consolidated simultaneously on all sides to prevent wedge action and displacement. Fill and backfill materials shall be spread in 6 inch uniform horizontal layers with each layer compacted separately to required density.
7. Lay all piping on a compacted bed of sand at least 3 inches deep. Backfill around pipes with sand, 6 inch layers, and compact each layer.
8. Use sand for backfill up to grade for all piping under slabs or paved areas. All other piping shall have sand backfill to 6 inches above the top of the pipe.
9. Place all backfill above the sand in uniform layers not exceeding 6 inches deep. Each layer shall be placed, then carefully and uniformly tamped, to eliminate lateral or vertical displacement.
10. Where the fill and backfill will ultimately be under a building, floor or paving, each layer of fill shall be compacted to 95% of the maximum density determined by AASHTO Designation T-99 or ASTM Designation D-698. Moisture content of soil at time of compaction shall not exceed plus or minus 2% of optimum moisture content determined by AASHTO T-99 or ASTM D-698 test.

F Surface Restoration:
1. Where trenches are cut through graded, planted or landscaped areas, the areas shall be restored to the original condition. Replace all planting removed or damaged to its original condition. A minimum of 6 inches of topsoil shall be applied where disturbed areas are to be seeded or sodded.
2. Concrete or asphalt type pavement, seal coat, rock, gravel or earth surfaces removed or damaged shall be replaced with comparable materials and restored to original condition.

3.3 ARCHITECT/ENGINEER OBSERVATION OF WORK

A The Contractor shall provide seven (7) calendar days' notice to the Architect/Engineer prior to:
1. Placing fill over underground and underslab utilities.
2. Covering exterior walls, interior partitions and chases.
3. Installing hard or suspended ceilings and soffits.

B The Architect/Engineer will have the opportunity to review the installation and provide a written report noting deficiencies requiring correction. The Contractor's schedule shall account for these reviews and show them as line items in the approved schedule.

C Above-Ceiling Final Observation
1. All work above the ceilings must be complete prior to the Architect/Engineer's review. This includes, but is not limited to:
   a. Pipe insulation is installed and fully sealed.
   b. Pipe and duct wall penetrations are sealed.
   c. Pipe identification and valve tags are installed.
   d. Main, branch and flexible ducts are installed.
   e. Diffusers, registers and grilles are installed and connected to ductwork.
   f. Terminal air box reheat coil piping or wiring is complete.
   g. Terminal air box control wiring is complete and all control boxes are closed.
2. In order to prevent the Above-Ceiling Final Observation from occurring too early, the Contractor shall review the status of the work and certify, in writing, that the work is ready for the Above-Ceiling Final Observation.
3. It is understood that if the Architect/Engineer finds the ceilings have been installed prior to this review and prior to 7 days elapsing, the Architect/Engineer may not recommend further payments to the contractor until such time as full access has been provided.

3.4 PROJECT CLOSEOUT

A The following paragraphs supplement the requirements of Division 1.

B Final Jobsite Observation:
1. In order to prevent the Final Jobsite Observation from occurring too early, the Contractor is required to review the completion status of the project and certify that the job is ready for the final jobsite observation.
2. Attached to the end of this section is a typical list of items that represent the degree of job completeness expected prior to requesting a review.
3. Upon Contractor certification that the project is complete and ready for a final observation, the Contractor shall sign the attached certification and return it to the Architect/Engineer so that the final observation can be scheduled.
4. It is understood that if the Architect/Engineer finds the job not ready for the final observation and that additional trips and observations are required to bring the project to completion, the costs incurred by the Architect/Engineer's additional time and expenses will be deducted from the Contractor's contract retainage prior to final payment at the completion of the job.

C Before final payment is authorized, this Contractor must submit the following:
1. Operation and maintenance manuals with copies of approved shop drawings.
2. Record documents including marked-up or reproducible drawings and specifications.
3. A report documenting the instructions given to the Owner's representatives complete with the number of hours spent in the instruction. The report shall bear the signature of an authorized agent of This Contractor and shall be signed by the Owner's representatives.
4. Inspection by State Boiler Inspector.
5. Start-up reports on all equipment requiring a factory installation inspection or start- up.
6. Provide spare parts, maintenance, and extra materials in quantities specified in individual specification sections. Deliver to project site and place in location as directed; receipt by Architect/Engineer required prior to final payment approval.

3.5 OPERATION AND MAINTENANCE MANUALS

A General:
1. Provide an electronic copy of the O&M manuals as described below for Architect/Engineer's review and approval. The electronic copy shall be corrected as required to address the Architect/Engineer's comments. Once corrected, electronic copies and paper copies shall be distributed as directed by the Architect/Engineer.
2. Approved O&M manuals shall be completed and in the Owner's possession prior to Owner's acceptance and at least 10 days prior to instruction of operating personnel.

B Electronic Submittal Procedures:
1. Distribution: Email the O&M manual as attachments to all parties designated by the Architect/Engineer.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
   a. O&M file name: O&M.div23.contractor.YYYYMMDD
5. File Size: Electronic file size shall be limited to a maximum of 10MB. Larger files shall be divided into files that are clearly labeled as "1 of 2", "2 of 2", etc.
6. Provide the Owner with an approved copy of the O&M manual in digital format which is tabbed and bookmarked accordingly.
7. All text shall be searchable.
8. Bookmarks shall be used, dividing information first by specification section, then systems, major equipment and finally individual items. All bookmark titles shall include the nomenclature used in the construction documents and shall be an active link to the first page of the section being referenced.

C Operation and Maintenance Instructions shall include:
1. Title Page: Include title page with project title, Architect, Engineer, Contractor, all subcontractors, and major equipment suppliers, with addresses, telephone numbers, website addresses, email addresses and point of contacts. Website URLs and email addresses shall be active links in the electronic submittal.
2. Table of Contents: Include a table of contents describing specification section, systems, major equipment, and individual items.
3. Copies of all final approved shop drawings and submittals. Include Architect's/Engineer's shop drawing review comments. Insert the individual shop drawing directly after the Operation and Maintenance information for the item(s) in the review form.
4. Copy of final approved test and balance reports.
5. Copies of all factory inspections and/or equipment startup reports.
6. Copies of warranties.
7. Schematic wiring diagrams of the equipment that have been updated for field conditions. Field wiring shall have label numbers to match drawings.
8. Dimensional drawings of equipment.
9. Capacities and utility consumption of equipment.
10. Detailed parts lists with lists of suppliers.
11. Operating procedures for each system.
12. Maintenance schedule and procedures. Include a chart listing maintenance requirements and frequency.
13. Repair procedures for major components.
14. List of lubricants in all equipment and recommended frequency of lubrication.
15. Instruction books, cards, and manuals furnished with the equipment.

3.6 INSTRUCTING THE OWNER'S REPRESENTATIVES

A Adequately instruct the Owner's designated representatives in the maintenance, care, and operation of all systems installed under this contract.

B Provide verbal and written instructions to the Owner's representatives by FACTORY PERSONNEL in the care, maintenance, and operation of the equipment and systems.

C Contractor shall make a DVD video recording of instructions to the Owner while explaining the system so additional personnel may view the instructions at a later date. The video recording shall be the property of the Owner.

D The instructions shall include:
1. Explanation of all system flow diagrams.
2. Explanation of all air handling systems.
3. Temperature control system operation including calibration, adjustment and proper operating conditions of all sensors.
4. Maintenance of equipment.
5. Start-up procedures for all major equipment.
6. Explanation of seasonal system changes.

E The Architect/Engineer shall be notified of the time and place instructions will be given to the Owner's representatives so he or his representative can attend if desired.

F Minimum hours of instruction for each item shall be:
1. Heating Water System - 8 hours.
2. Chilled Water System - 8 hours.
3. Chemical Treatment System - As defined in Section 23 25 00.
4. Combustion Air System - 4 hours.
5. Air Handling System(s) - 8 hours.
6. Computer Room System(s) - 2 hours.
7. Exhaust System(s) -4 hours.
8. Temperature Controls - As defined in Section 23 09 00.

G The Contractor shall prepare a detailed, written training agenda and submit it to the Architect/Engineer a minimum of four weeks prior to the formal training for approval. The written agenda shall include specific training points within the items described above. For example: how to adjust setpoints, troubleshooting, proper start-up, proper shut-down, seasonal changes, draining, venting, changing filters, changing belts, etc. Failure to provide and follow an approved training agenda may result in additional training required at the expense of the Contractor.

H Operating Instructions:
1. Contractor is responsible for all instructions to the Owner's representatives for the mechanical and control systems.
2. If the Contractor does not have staff that can adequately provide the required instructions he shall include in his bid an adequate amount to reimburse the Owner for the Architect/Engineer to perform these services.

3.7 RECORD DOCUMENTS

A The following paragraph supplements Division 1 requirements:
1. Contractor shall maintain at the job site a separate and complete set of mechanical drawings and specifications on which he shall clearly and permanently mark in complete detail all changes made to the mechanical systems.

B Mark drawings to indicate revisions to piping and ductwork, size and location, both exterior and interior; including locations of coils, dampers, other control devices, filters, and other
1. units requiring periodic maintenance or repair; actual equipment locations, dimensioned from column lines; actual inverts and locations of underground piping; concealed equipment, dimensioned from column lines; mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (e.g., traps, strainers, expansion compensators, tanks, etc.); Change Orders; concealed control system devices.

C Refer to Section 23 09 00 for additional requirements for Temperature Control documents.

D Before completion of the project, a set of reproducible mechanical drawings will be given to the Contractor for transfer of all as-built conditions from the paper set maintained at the job site. All marks on reproducibles shall be clear and permanent.

E Mark specifications to show approved substitutions; Change Orders, and actual equipment and materials used.

F Record changes daily and keep the marked drawings available for the Architect/Engineer's examination at any normal work time.

G Upon completing the job, and before final payment is made, give the marked-up drawings to the Architect/Engineer.

3.8 FIRE CAULKING

A This contractor is responsible for all fire caulking around all penetratins of duct, pipe, conduit or any misc items which pass through fire rated asseblies which require fire caulking and protection of the penetration.

3.9 ADJUST AND CLEAN

A Thoroughly clean all equipment and systems prior to the Owner's final acceptance of the project. Clean all foreign paint, grease, oil, dirt, labels, stickers, and other foreign material from all equipment.

B Clean all drain pans and areas where moisture is present. Immediately report any mold, biological growth, or water damage.

C Remove all rubbish, debris, etc., accumulated during construction from the premises.

3.10 SPECIAL REQUIREMENTS

A Contractor shall coordinate the installation of all equipment, valves, dampers, operators, etc., with other trades to maintain clear access area for servicing.

B All equipment shall be installed in such a way to maximize access to parts needing service or maintenance. Review the final field location, placement, and orientation of equipment with the Owner's designated representative prior to setting equipment.

C Installation of equipment or devices without regard to coordination of access requirements and confirmation with the Owner's designated representative will result in removal and reinstallation of the equipment at the Contractor's expense.

END OF SECTION

SECTION 230553

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A Nameplates.
B Tags.
C Adhesive-backed duct markers.
D Stencils.
E Pipe markers.
F Ceiling tacks.

1.2 RELATED REQUIREMENTS

A Section 099123 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

A ASME A13.1 - Scheme for the Identification of Piping Systems; 2020.
B ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.

B Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

C Manufacturer's Installation Instructions: Indicate special procedures, and installation.

D Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

A Air Handling Units: Nameplates.
B Ductwork: Stencilled painting.
C Heat Transfer Equipment: Nameplates.
D Piping: Pipe markers.
E Valves: Tags and ceiling tacks where located above lay-in ceiling.

2.2 NAMEPLATES

A Letter Color: White.
B Letter Height: 1/4 inch.
C Background Color: Black.
D Plastic: Comply with ASTM D709.

2.3 TAGS

A Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
B Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
C Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.4 ADHESIVE-BACKED DUCT MARKERS

A Material: High gloss acrylic adhesive-backed vinyl film 0.0032 inch; printed with UV and chemical resistant inks.
B Style: Individual Label.
C Color: Yellow/Black.

2.5 STENCILS

A Stencils: With clean cut symbols and letters of following size:
1. 3/4 to 1-1/4 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 1/2 inch high letters.
2. 1-1/2 to 2 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 3/4 inch high letters.
3. 2-1/2 to 6 inch Outside Diameter of Insulation or Pipe: 12 inch long color field, 1-1/4 inch high letters.
4. 8 to 10 inch Outside Diameter of Insulation or Pipe: 24 inch long color field, 2-1/2 inch high letters.
5. Over 10 inch Outside Diameter of Insulation or Pipe: 32 inch long color field, 3-1/2 inch high letters.
6. Ductwork and Equipment: 2-1/2 inch high letters.

B Stencil Paint: As specified in Section 099123, semi-gloss enamel, colors complying with ASME A13.1.

2.6 PIPE MARKERS

A Color: Comply with ASME A13.1.
B Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
C Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
D Color code as follows:
1. Heating, Cooling, and Boiler Feedwater: Green with white letters.
2. Compressed Air: Blue with white letters.

2.7 CEILING TACKS

A Description: Steel with 3/4 inch diameter color coded head.
B Color code as follows:
1. HVAC Equipment: Yellow.
2. Fire Dampers and Smoke Dampers: Red.
3. Heating/Cooling Valves: Blue.

PART 3 EXECUTION

3.1 PREPARATION

A Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
B Apply stencil painting in accordance with Section 099123.
C Install plastic pipe markers in accordance with manufacturer's instructions.
D Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
E Use tags on piping 3/4 inch diameter and smaller.
F Install ductwork with stencilled painting. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of

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penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 230593

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

A Testing, adjustment, and balancing of air systems.

1.2 RELATED REQUIREMENTS

A Section 012100 - Allowances: Inspection and testing allowances.

1.3 PRICE AND PAYMENT PROCEDURES

A Cash Allowance: See Section 012100 for additional requirements.

B Allowance includes testing, adjusting, and balancing of mechanical systems.

1.4 REFERENCE STANDARDS

A ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008, with Errata (2019).

1.5 SUBMITTALS

A See Section 013000 - Administrative Requirements, for submittal procedures.

B TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.

1. Include at least the following in the plan:
   a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
   b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
   c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
   d. Final test report forms to be used.
   e. Procedures for formal deficiency reports, including scope, frequency and distribution.

C Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

1. Revise TAB plan to reflect actual procedures and submit as part of final report.
2. Submit draft copies of report for review prior to final aceptance of Project. Provide final copies for Engineer and for inclusion in operating and maintenance manuals.
3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A Perform total system balance in accordance with one of the following:

B Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C TAB Agency Qualifications:

1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
2. Having minimum of three years documented experience.
3. Certified by one of the following:

D TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

E Pre-Qualified TAB Agencies:

1. Design Control.
2. Balancing Professionals.

3.2 EXAMINATION

A Verify that systems are complete and operable before commencing work. Installing Contractor shall ensure the following conditions:

1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Access doors are closed and duct end caps are in place.
8. Air outlets are installed and connected.
9. Duct system leakage is minimized.

B Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

3.3 PREPARATION

A Hold a pre-balancing meeting at least one week prior to starting TAB work.

B Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer to facilitate spot checks during testing.

3.4 ADJUSTMENT TOLERANCES

A Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

C Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.5 RECORDING AND ADJUSTING

A Field Logs: Maintain written logs including:

1. Running log of events and issues.
2. Discrepancies, deficient or uncompleted work by others.
3. Contract interpretation requests.
4. Lists of completed tests.

B Ensure recorded data represents actual measured or observed conditions.

C Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

E Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.6 AIR SYSTEM PROCEDURE

A Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C Measure air quantities at air inlets and outlets.

D Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

F Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

G Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

H Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

I Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.

J Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.

K For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

3.7 SCOPE

A Test, adjust, and balance the following:

3.8 MINIMUM DATA TO BE REPORTED

A Duct Traverses:

1. System zone/branch.
2. Duct size.
3. Area.
4. Design velocity.
5. Design air flow.
6. Test velocity.
7. Test air flow.
8. Duct static pressure.
9. Air temperature.
10. Air correction factor.

SECTION 230713

DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A Duct insulation.

B Duct liner.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

A ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.

B ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2023.

C ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).

D ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).

E ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2020.

F ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

G ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).

H ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

I SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

J UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.

B Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.5 QUALITY ASSURANCE

A Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

B Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

C All insulation shall be replaced if subjected to water or moisture during installation. Contractor is not allowed to dry insulation in place.

1.7 FIELD CONDITIONS

A Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER, FLEXIBLE

A Manufacturer:

1. CertainTeed Corporation: www.certainteed.com/#sle.
2. Johns Manville: www.jm.com/#sle.
3. Knauf Insulation: www.knaufinsulation.com/#sle.
4. Owens Corning Corporation: www.ocbuildingspec.com/#sle. SoftR Ductwrap FRK

B Insulation: ASTM C553; flexible, noncombustible blanket.

1. K value: 0.25 at 75 degrees F, when tested in accordance with ASTM C518.
2. Maximum Service Temperature: 850 degrees F.
3. Maximum Water Vapor Absorption: 5.0 percent by weight.
4. Density: 1.0 PCF
5. Installed R Value: R-6 2" Thick

C Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
3. Secure with pressure-sensitive tape.
4. Provide 2" Staple Overlap

D Vapor Barrier Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.

E Tie Wire: Annealed steel, 16 gauge, 0.0508 inch diameter.

2.3 GLASS FIBER, RIGID

A Manufacturer:

1. CertainTeed Corporation: www.certainteed.com/#sle.
2. Johns Manville: www.jm.com/#sle.
3. Knauf Insulation: www.knaufinsulation.com/#sle.
4. Owens Corning Corporation; 700 Series FIBERGLAS Insulation: www.ocbuildingspec.com/#sle.

B Insulation: ASTM C612; rigid, noncombustible blanket.

1. K Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.
2. Maximum Service Temperature: 450 degrees F.
3. Maximum Water Vapor Absorption: 5.0 percent.
4. Maximum Density: 8.0 pcf.
5. Thermal Performance: R-6.5 at 1.5"

C Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
3. Secure with pressure-sensitive tape.

D Vapor Barrier Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.

2.4 DUCT LINER

A Manufacturers:

1. Aeroflex USA, Inc; AEROFLEX Breathe-EZ: www.aeroflexusa.com/#sle.
2. Armacell LLC; ArmaFlex Ultra with FlameDefense: www.armacell.us/#sle.
3. CertainTeed Corporation: www.certainteed.com/#sle.
4. Ductmate Industries, Inc, a DMI Company: www.ductmate.com/#sle.
5. Owens Corning Corporation; QuietR Rotary Duct Insulation: www.ocbuildingspec.com/#sle.

B Elastomeric Foam Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.

1. Minimum Service Temperature: Minus 40 degrees F.
2. Maximum Service Temperature: 180 degrees F.
3. Fungal Resistance: No growth when tested according to ASTM G21.
4. Apparent Thermal Conductivity: Maximum of 0.28 at 75 degrees F.
5. Minimum Noise Reduction Coefficients:
   a. 1/2 inch Thickness: 0.30.
   b. 1 inch Thickness: 0.40.
6. Connection: Waterproof vapor barrier adhesive.

C Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation. Comply with ASTM C916.

D Adhesive: Waterproof, fire-retardant type, ASTM C916.

E Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 EXECUTION

3.1 EXAMINATION

A Test ductwork for design pressure prior to applying insulation materials.

B Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

A Install in accordance with manufacturer's instructions.

B Install in accordance with NAIMA National Insulation Standards.

C Insulated Ducts Conveying Air Below Ambient Temperature:

1. Provide insulation with vapor barrier jackets.
2. Finish with tape and vapor barrier jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

D Insulated Ducts Conveying Air Above Ambient Temperature:

1. Provide with or without standard vapor barrier jacket.
2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

E Ducts Exposed in Mechanical Equipment Rooms or Finished Spaces (below 10 feet above finished floor): Install Rigid Fiber glass insulation. Finish with canvas jacket sized for finish painting.

F External Duct Insulation Application:

1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
2. Secure insulation without vapor barrier with staples, tape, or wires.
3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

G Duct and Plenum Liner Application:

1. Adhere insulation with adhesive for 90 percent coverage.
2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
3. Seal and smooth joints. Seal and coat transverse joints.
4. Seal liner surface penetrations with adhesive.
5. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.

3.3 SCHEDULES (ALL R VALUES ARE INSTALLED VALUES)

A Insulation thickness of Ductwork shall be in accordance with table C403.12.3 of the IECC 2021 addition.

B Concealed Supply Air Duct Insulation: Glass Fiber Flexible, Thickness to a minimum R-6.

C Combustion Air Duct Insulation on Gas Unit Heaters: Glass Fiber Flexible, Thickness to a minimum R-6.

D Concealed Exhaust Air Duct Insulation: Glass Fiber Flexible, Thickness to a minimum R-6 (First 10'-0" of Ductwork to the exterior).

E Concealed Outside Air Duct Insulation: Glass Fiber Flexible, Thickness to a minimum R-12.

F Concealed return and exhaust ductwork in conditionted spaces.

G Exposed supply and return: None.

H Duct Liner: As indicated on plans.

END OF SECTION

SECTION 230950

GAS DETECTION AND ALARM

PART 1 GENERAL

1.1 SECTION INCLUDES

A Parking Garage Gas detection monitors and sensor modules

B Refrigerant Gas Detection

C Boiler Room Gas detection monitors and alarms

1.2 SUBMITTALS

A Product Data: For each type of gas monitor, include sensing range in ppm, temperature and humidity range, alarm outputs, display range, furnished specialties, installation requirements, and electric power requirement.

B Provide Wiring Diagrams: Power, signal, and control wiring.

C Closeout Submittals: Owner and Maintenance Data.

1.3 QUALITY ASSURANCE

A Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.

B Documents at Project Site: Maintain at project site one copy of manufacturer's instructions, erection drawings, and shop drawings.

C All Gas detection systems shall comply with UL 2075

1.4 WARRANTY

A See Section 017800 - Closeout Submittals for additional warranty requirements.

B Manufacturer Warranty: Provide 2-year manufacturer warranty for enitre system. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 PARKING GARAGE GAS DETECTION

A Manufacturers

1. American Gas Safety - Basis of Design
2. Armstrong
3. Belimo
4. Honeywell

B Control Module UL61010

1. Enclosure: ASA 61 gray enameled 16 gauge steel.
2. Supply Voltage: 120 VAC, 60 Hz.
3. Operating Temperature: -4°F to 104°F.
4. Monitor Warranty: 2 years.
5. Touch Screen Control Panel
6. Relays for activation
   a. On/Off
   b. Two Speed
   c. 0-10Vdc VFD operation
7. Relays shall be provided for pre-alarm, high alram and full alram threshold.
8. Provide a damper relay which is configurable to an onsite actuator at a determined threshold.
9. Unit shall accept up to 16 remote sensors.
10. Activated audible alarm shall provide 85 dBA @10ft.
11. BMS output for monitoring.

C Alarm Beacon

1. Provide a dual audible and visual alarm beacon constructed of polycarbonate enclosesure with high intensity LED's
2. The alarm shall provide 32 selectable sirens and volume options and 8 flash patterns
3. The beacon shall be powered by the gas detection panel in alarm via 24vdc output.
4. Install on signle gang rough in box outside of the protected area.

D Gas Detection Modules.

1. Sensor Modules to be provide by same manufacturer as the control module.
2. Detectable Gasses: Carbon Monoxide & Nitrous Oxide.
3. Power: 24 VAC
4. Sensor Type: Electrochemical.
5. Range: As recommended by manuf. COX & NO2.
6. Sensor Warranty: COX & NO2 – 3 years.
7. Standard trip points: as recommended by manuf. COX & NO2.
   a. Installation wiring: 3 wire 18 AWG shielded.

E Temperature and Humidity Modules. (Washbays and Areas with Floor Heat)

1. Sensor Modules to be provide by same manufacturer as the control module.
2. Detection: Temperature and Humidity
3. Power: 24 VAC
4. Sensor Type: Electrochemical.

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5. Range: As recommended by manuf. Temperature and RH
6. Sensor Warranty: 3 years.
7. Standard trip points: 50% RH (Adjustable)
   a. Installation wiring: 3 wire 18 AWG shielded.

2.2 BOILER ROOM GAS DETECTORS AND MONITORS

A Manufacturers:
1. American Gas Safety (AGS) Mini Merlin
2. Belimo
3. Approved Alternatives

B The device will be 120 Vac powered, individually powered and capable of accepting the inputs of multiple devices. The unit will clearly display the condition of an alarm and provide hazardous or toxic gas levels via ppm or % of VOL. The device shall provide a re-set and test function. The device shall incorporate dual sensor technology to detect Methane and CO (Carbon Monoxide) without the requirement for additional components. The unit shall be UL certified and listed. Mount the panel per manufacturer's instructions and recommendations.

C The device panel will be capable of transmitting alarm conditions to a BMS system through its dry contact relay output. For local activation of fans or louvers (or other equipment), the relay will change state in alarm and revert back once the alarm has been removed.

D The device panel will be capable of operating within relative humidity ranges of 5-95% non- condensing and temperature ranges of -4° F to 140° F (-20° C to 60° C).

E The device will be certified and listed to ANSI/UL 61010-1 3rd edition and CAN/CSA-C22.2 No. 61010-1.

F The device will energize a 120v output to control gas solenoid valves and electrical contactors. In alarm the device shall de-energize this control output.

G For local activation of audible alarms, the transmitter shall have an on-board device able to generate an audible output of 85 dBA @ 10 ft.

H The unit shall provide a traffic signal type colored TFT display, Green – all clear, Yellow – warning (low alarm) Red – Alarm.

I Detector alarm levels are to be activated and the unit is to be installed in accordance with the following parameters:

J The sensors shall be UL listed to comply with UL2075 and incorporate filters to only look for the desired hazardous or toxic gases selected.

K Local Building Codes recommendations take precedence over these parameters. Coverage can differ depending on application.

L Accessories
1. Detector Guards type AGSGUARD. The grid is made of a 9-gauge steel wire. The guard must be designed to allow calibration without removing the guards
2. Remote Panic Button type AGSEBSTW Panic Button will be constructed of tough polycarbonate with a stainless steel back plate capable of operating within relative humidity ranges of 0-100% and temperature ranges of -40° F to 250° F (-40° C to 121° C). Unit will be clearly labeled "EMERGENCY BOILER SHUT-OFF" with 5/8" black text on yellow background with red mushroom type button. Unit will be certified and listed to UL safety standards and be ADA compliant.
3. Gas Valve type MERLIN4INF shall be 120v actuated flanged gas solenoid with an operating pressure 0f 0-5PSI. Constructed of die-cast aluminum with a fluid powered actuator. The valves should be UL listed as a safety shut-off valve with a closing time of <1second.
4. Electric Contactor type AGS4P50ANO shall be 120V energized electrically held normally open contactor providing 4 Poles (circuits) at 50 AMP at 120v 50/60HZ. Contactor shall be UL listed.

2.3 SOURCE QUALITY CONTROL

A See Section 014000 - Quality Requirements for additional requirements.

PART 3 EXECUTION

3.1 INSTALLATION

A Install in accordance with manufacturer's written instructions. See drawing schedule for basis of design. If alternate manufacturer is provided. Contractor shall provide all modifications necessary to install a fully functional system.

B Comply with ASHRAE.

C Install sampling inlets that are accessible to personnel.

D Wall mount air-sampling multiple-point monitors with top of unit 60 inches above finished floor.

E Run air-sampling conduit and wire from monitor to air-sampling point, in size as required by monitor manufacturer.

F Extend air-sampling tubing from exhaust part of multiple-point monitors to outside.

G Visible Alarm-Indicating Devices: Install adjacent to each alarm horn at each entry door to refrigeration equipment room, and position at least 6 inches

H The basis of design provides one 120 volt circuit by electrical contractor to the alarm panel. Div 23 contractor to provide all 24 volt wiring and conduit to provide interconnection to all remote sensors and alarms. Any modifications to the basis of design shall be covered by Div. 23

3.2 SYSTEM STARTUP

A Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B Perform tests and inspections and prepare test reports.

C Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D Tests and Inspections:
1. Inspect field-assembled components, equipment installation, and electrical connections for compliance with requirements.
2. Test and adjust controls and safeties.

E Test Reports: Prepare a written report to record the following:

F Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

G Repair or replace malfunctioning units and retest as specified above.

3.3 CLOSEOUT ACTIVITIES

A Demonstrate proper operation of equipment to Owner's designated representative.

B Training: Train Owner's personnel on operation and maintenance of system.
1. Training Reference: Operation and maintenance manual and additional training materials as required.
2. Provide minimum of two hours of training.

END OF SECTION

SECTION 231123
FACILITY NATURAL-GAS PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A Pipe, pipe fittings, valves, and connections for natural gas piping systems.

1.2 RELATED REQUIREMENTS

A Section 099113 - Exterior Painting.

B Section 335216 - Gas Hydrocarbon Piping.

1.3 REFERENCE STANDARDS

A ANSI Z21.18/CSA 6.3 - Gas Appliance Pressure Regulators; 2019.

B ANSI Z21.80/CSA 6.22 - Line Pressure Regulators; 2019.

C ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023, with Errata (2024).

D ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.

E ASME B31.1 - Power Piping; 2024.

F ASME B31.9 - Building Services Piping; 2020.

G ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.

H ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

I ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2023a.

J MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements, for submittal procedures.

B Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

C Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

D Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 016000 - Product Requirements, for additional provisions.

1.5 QUALITY ASSURANCE

A Perform work in accordance with applicable codes.

B Valves: Manufacturer's name and pressure rating marked on valve body.

C Welding Materials and Procedures: Comply with ASME BPVC-IX and applicable state labor regulations.

D Welder Qualifications: Certified in accordance with ASME BPVC-IX.

E Identify pipe with marking including size, ASTM material classification, and ASTM specification.

1.6 DELIVERY, STORAGE, AND HANDLING

A Provide temporary protective coating on cast iron and steel valves.

B Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

C Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.7 FIELD CONDITIONS

PART 2 PRODUCTS

2.1 NATURAL GAS PIPING, ABOVE GRADE

A Steel Pipe: ASTM A53/A53M, Grade B, Type F, Schedule 40 black.
1. Manufacturers:
   a. Wheatland Tube Company: www.wheatland.com/#sle.
2. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
3. Joints: Threaded or welded to ASME B31.1.

2.2 GAS RISER AND TRANSISTION FITTING

A PE Pipe: Gastit or Equal
1. All pipe shall meet or exceed the requirements of ASTM D2513 and carry the appropriate pipe category rating. PE pipe shall be IAPMO/UPC and CSA listed where applicable and marked.

B Protective Casing
1. Steel Tubing per ASTM A513, Minimum wall shall be schedule 40.

C O Ring shall be Buna-N per ASTM D2000

D Epoxy Coating shall be electrostatically applied fusion bonded epoxy coating of minimum of 8 mills. Color shall be grey metalic. Cathodic disbondment shall be as per ASTM G8.

2.3 FLANGES, UNIONS, AND COUPLINGS

A Unions for Pipe Sizes 3 Inches and Under:
1. Ferrous Pipe: Class 150 malleable iron threaded unions.

2.4 PIPE HANGERS AND SUPPORTS

A Provide hangers and supports that comply with MSS SP-58.
1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
3. Trapeze Hangers: Welded steel channel frames attached to structure.
4. Vertical Pipe Support: Steel riser clamp.
5. Rooftop Supports for Low-Slope Roofs: Steel pedestals with bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified; and as follows:
   a. Bases: High density polypropylene.
   b. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
   c. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
   d. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion resistant material.
   e. Height: Provide minimum clearance of 6 inches under pipe to top of roofing.

2.5 BALL VALVES

A Construction, 3 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, Teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder or threaded ends with union.

2.6 STRAINERS

A Size 2 inch and Under:
1. Threaded brass body for 175 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.
2. Class 150, threaded bronze body 300 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.

B Size 1-1/2 inch to 4 inch:
1. Class 125, flanged iron body, Y pattern with 1/16 inch stainless steel perforated screen.

2.7 LINE PRESSURE REGULATORS AND APPLIANCE REGULATORS INDICATORS

A Manufacturers:
1. Maxitrol Company: www.maxitrol.com/#sle.

B Compliance Requirements:
1. Appliance Regulator: ANSI Z21.18/CSA 6.3.
2. Line Pressure Regulator: ANSI Z21.80/CSA 6.22.

C Materials in Contact With Gas:
1. Housing: Aluminum, steel (free of non-ferrous metals).
2. Seals and Diaphragms: NBR-based rubber.

D Maximum Inlet Operating Pressure: 5 psi.
1. Appliance Regulator: 5 psi.
2. Line Pressure Regulator: 5 psi.

E Maximum Body Pressure: 10 psi.

F Output Pressure Range: 7 inch wc to 11 inch wc.

PART 3 EXECUTION

3.1 EXAMINATION

A Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B Remove scale and dirt, on inside and outside, before assembly.

C Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

A Install in accordance with manufacturer's instructions.

B Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

C Install piping to maintain headroom, conserve space, and not interfere with use of space.

D Group piping whenever practical at common elevations.

E Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

F Provide access where valves and fittings are not exposed.

G Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

H Provide support for utility meters in accordance with requirements of utility companies.

I Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.
1. Painting of exterior piping systems and components is specified in Section 099113. Mechanical contractor shall paint exterior piping with 2 coats of rust resistant yellow paint.

J Install valves with stems upright or horizontal, not inverted.

K Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.

L Sleeve pipes passing through partitions, walls and floors.

M Pipe Hangers and Supports:
1. Install in accordance with ASME B31.9.
2. Support horizontal piping as indicated.
3. Install hangers to provide minimum 2 inch space between finished covering and adjacent work.
4. Place hangers within 12 inches of each horizontal elbow.
5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
6. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
8. Provide copper plated hangers and supports for copper piping.
9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

3.4 APPLICATION

A Install unions downstream of valves and at equipment or apparatus connections.

B Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

3.5 SERVICE CONNECTIONS

A Mechanical Contractor shall provide, coordinate, and pay for all utility costs for new gas service complete with gas meter and regulators. Gas service distribution piping to have initial minimum pressure of 2 psi. Provide regulators on each line serving gravity type appliances, sized in accordance with equipment.

3.6 SCHEDULES

A Pipe Hanger Spacing:
1. Metal Piping:
   a. Pipe Size: 1/2 inches to 1-1/4 inches:
      1) Maximum Hanger Spacing: 6.5 ft.
      2) Hanger Rod Diameter: 3/8 inches.
   b. Pipe Size: 1-1/2 inches to 2 inches:
      1) Maximum Hanger Spacing: 10 ft.
      2) Hanger Rod Diameter: 3/8 inch.

END OF SECTION

SECTION 233100
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A Metal ducts.

B Flexible ducts.

1.2 RELATED REQUIREMENTS

A Section 078400 - Firestopping.

B Section 230130.51 - HVAC Air-Distribution System Cleaning: Post install duct cleaning.

C Section 230713 - Duct Insulation: External insulation and duct liner.

D Section 233300 - Air Duct Accessories.

E Section 233600 - Air Terminal Units.

F Section 233700 - Air Outlets and Inlets: Fabric air distribution devices.

1.3 REFERENCE STANDARDS

A ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

B ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

C ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

D NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.

E NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2024.

F SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

G UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.

B Product Data: Provide data for duct materials.

C Shop Drawings: Indicate duct fitting types, gauges, sizes, welds, and configuration.

D Manufacturer's Certificate: Certify that installation of glass fiber ductwork meets or exceed specified requirements.

1.5 QUALITY ASSURANCE

A Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.

B Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum three years of documented experience.

1.6 FIELD CONDITIONS

A Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.

B Duct Shape and Material in accordance with Allowed Static Pressure Range: General Mechanical Areas
1. Round: Plus or minus 2 in-wc of G60-coated galvanized steel.
2. Rectangular: Plus or minus 2 in-wc of G60-coated galvanized steel.
3. Flat Oval: Plus 2 in-wc of galvanized steel.
4. Flexible Duct (Fabric and wire): Plus or minus 2 in-wc; see Section 233700.

C Duct Sealing and Leakage in accordance with Static Pressure Class:
1. Low Pressure Service: Up to 2 in-wc:
   a. Seal: Class C, apply to seal off transverse joints.
   b. Leakage:
      1) Rectangular: Class 24 or 24 cfm/100 sq ft.
      2) Round: Class 12 or 12 cfm/100 sq ft.
2. Low Pressure Service: From 2 in-wc to 3 in-wc:
   a. Seal: Class B, apply sealing of transverse joints and longitudinal seams.
   b. Leakage:
      1) Rectangular: Class 12 or 12 cfm/100 sq ft.
      2) Round: Class 6 or 6 cfm/100 sq ft.
3. Medium and High Pressure Service: Above 3 in-wc:
   a. Seal: Class A, apply sealing of transverse joints, longitudinal seams, and duct wall penetrations.
   b. Leakage:
      1) Rectangular: Class 6 or 6 cfm/100 sq ft.
      2) Round: Class 3 or 3 cfm/100 sq ft.

D Duct Fabrication Requirements:
1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
2. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
3. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide airfoil turning vanes of perforated metal with glass fiber insulation.
4. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
5. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
6. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.2 METAL DUCTS

A Material Requirements:
1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.

B Flat-Oval Metal Ducts:
1. Flat-Oval Single Wall Duct: Machine made from a round spiral lock seam duct.
   a. Fittings: Manufacture at least two gauges heavier metal than the duct.
   b. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.

C Round Metal Ducts:

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1. Round Single Wall Duct: Round lock seam duct with galvanized steel outer wall.
2. Round Connection System: Interlocking duct connection system in accordance with SMACNA (DCS).
   a. Manufacturers:
      1) Ductmate Industries, Inc, a DMI Company: www.ductmate.com/#sle.

D Round Spiral Duct:
1. Round spiral lock seam duct with galvanized steel outer wall.

E Connectors, Fittings, Sealants, and Miscellaneous:
1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
2. Transverse Duct Connection System: SMACNA "E" rated rigid class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS).
3. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
   a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
   b. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
4. Gasket Tape:
   a. Provide butyl rubber gasket tape for a flexible seal between transfer duct connector (TDC), transverse duct flange (TDF), applied flange connections, and angle ring connections.
5. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.3 FLEXIBLE DUCTS

A Flexible Ducts: UL 181, Class 1, polyethylene film, mechanically fastened and rolled using galvanized steel to form spiral helix.
1. Insulation: R6 insulation with polyethylene vapor barrier film.
2. Pressure Rating: 10 in-wc positive and 2 in-wc negative.
3. Maximum Velocity: 5500 fpm.
4. Temperature Range: Minus 20 degrees F to 250 degrees F.

PART 3 EXECUTION

3.1 INSTALLATION

A Install, support, and seal ducts in accordance with SMACNA (DCS).
B Install products following the manufacturer's instructions.
C Comply with safety standards NFPA 90A and NFPA 90B.
D During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.
E Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
F Flexible Ducts: Connect to metal ducts with draw bands.
G Kitchen Hood Exhaust: Provide residue traps at the base of vertical risers with provisions for the cleanout.
H Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.
I Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
J Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with a crimp in the direction of airflow.
K Connect terminal units to supply ducts directly or with 3 feet maximum length of flexible duct. Do not use flexible duct to change direction.
L Connect diffusers or light troffer boots to low-pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp. Do not use flexible duct to change direction.
M Set plenum doors at 6 to 12 inches above floor. Arrange door swings so that fan static pressure holds door in closed position.
N At exterior wall louvers, seal duct to louver frame and install blank-out panels.
O Plenums and Casings:
1. Mount floor-mounted casings on 4 inch high concrete curbs.
P Fire Partitions: Provide firestopping sealing. See Section 078400.
Q Duct Accessories, Terminal Units, Inlets, and Outlets: Interconnect as indicated in Sections 233300, 233600, and 233700.
R Duct Insulation: Provide duct insulation. See Section 230713.

3.2 CLEANING

A Clean thoroughly each duct system if it becomes dirty during construction. See Section 230130.51.
B Clean duct system by forcing air at high velocity through duct to remove accumulated dust. Clean half the system at a time to obtain sufficient air. Protect equipment that could be harmed by excessive dirt with temporary filters or bypass during cleaning.
C Clean duct systems with high-power vacuum machines. Protect equipment that could be harmed by excessive dirt with filters or bypass during cleaning. Provide adequate access to the ductwork for cleaning purposes.

END OF SECTION

SECTION 233300
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A Air turning devices/extractors.
B Backdraft dampers - metal.
C Duct access doors.
D Duct test holes.
E Flexible duct connectors.
F Volume control dampers.
G Miscellaneous Products:
1. Flexible Duct Elbow Support

1.2 RELATED REQUIREMENTS

A Section 233100 - HVAC Ducts and Casings.

1.3 REFERENCE STANDARDS

A NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
B SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.
B Product Data: Provide for shop-fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.
C Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.
D Project Record Drawings: Record actual locations of access doors and test holes.

1.5 QUALITY ASSURANCE

A Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
B Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS

A Manufacturers:
1. Greenheck
2. Krueger-HVAC, Division of Air System Components: www.krueger-hvac.com/#sle.
3. Ruskin Company: www.ruskin.com/#sle.
4. Titus HVAC, a brand of Johnson Controls: www.titus-hvac.com/#sle.

B Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.2 BACKDRAFT DAMPERS - METAL

A Manufacturers:
1. Greenheck
2. Louvers & Dampers, Inc, a brand of Mestek, Inc: www.louvers-dampers.com/#sle.
3. Nailor Industries, Inc: www.nailor.com/#sle.
4. Pottorff: www.pottorff.com/#sle.
5. Ruskin Company: www.ruskin.com/#sle.
6. United Enertech: www.unitedenertech.com/#sle.

B Gravity Backdraft Dampers, Size 18 by 18 inches or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.
C Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.3 DUCT ACCESS DOORS

A Manufacturers:
1. Ductmate Industries, Inc, a DMI Company: www.ductmate.com/#sle.
2. Nailor Industries, Inc: www.nailor.com/#sle.
3. Ruskin Company: www.ruskin.com/#sle.

B Fabricate in accordance with SMACNA (DCS) and as indicated.
C Fabrication: Rigid and close fitting of galvanized steel with sealing gaskets and quick-fastening locking devices. For insulated ducts, install minimum 1-inch thick insulation with sheet metal cover.
1. Less Than 12 inches Square: Secure with sash locks.
2. Up to 18 inches Square: Provide two hinges and two sash locks.
3. Up to 24 by 48 inches: Three hinges and two compression latches with outside and inside handles.

D Access doors with sheet metal screw fasteners are not acceptable.

2.4 DUCT TEST HOLES

A Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
B Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.5 FLEXIBLE DUCT CONNECTORS

A Manufacturers:
1. Carlisle HVAC Products; Dynair Connector Plus G90 Steel Offset Seam Neoprene Fabric: www.carlislehvac.com/#sle.
2. Ductmate Industries, Inc, a DMI Company: www.ductmate.com/#sle.
3. Elgen Manufacturing Company, Inc: www.elgenmfg.com/#sle.

B Fabricate in accordance with SMACNA (DCS) and as indicated.
C Flexible Duct Connections: Fabric crimped into metal edging strip.
1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz/sq yd.
   a. Net Fabric Width: Approximately 2 inches wide.
D Maximum Installed Length: 14 inch.

2.6 VOLUME CONTROL DAMPERS

A Manufacturers:
B Fabricate in accordance with SMACNA (DCS) and as indicated.
C Splitter Dampers:
1. Material: Same gauge as duct to 24 inches size in either direction, and two gauges heavier for sizes over 24 inches.
2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.

D Single Blade Dampers:
1. Fabricate for duct sizes up to 6 by 30 inch.
2. Blade: 24 gauge, 0.0239 inch, minimum.

E End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.

2.7 MISCELLANEOUS PRODUCTS

A Flexible Duct Elbow Support
1. Manufacturer
   a. FlexRight
2. Clasified UL2043
3. Size: 4" to 16" diameter
4. Suppor Radius >8"
5. ASHRAE Compliant
6. Material: Recycled Polypropylene

B Welding Hood Canopy

PART 3 EXECUTION

3.1 PREPARATION

A Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

A Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 233100 for duct construction and pressure class.
B Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
C Provide duct test holes where indicated and required for testing and balancing purposes.
D Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum two duct widths from duct take-off.
E Use splitter dampers only where indicated.
F Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

SECTION 233423
HVAC POWER VENTILATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A Roof exhausters.
B Ceiling exhaust fans.

1.2 RELATED REQUIREMENTS

A Section 230548 - Vibration and Seismic Controls for HVAC.
B Section 233300 - Air Duct Accessories: Backdraft dampers.

1.3 REFERENCE STANDARDS

A AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
B AMCA 99 - Standards Handbook; 2016.
C AMCA 204 - Balance Quality and Vibration Levels for Fans; 2020.
D AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016.
E AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.
F AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2022.

1.4 ADMINISTRATIVE REQUIREMENTS

A Coordination: Coordinate fan roof curbs and service utilities installation according to fan size.
B Sequencing: Ensure that utility connections are completed in an orderly and expeditious manner.

1.5 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.
B Product Data: Provide data on fans and accessories, including fan curves with specified operating point plotted, power, rpm, sound power levels at rated capacity, and electrical characteristics and connection requirements.
C Manufacturer's Instructions: Indicate installation instructions.
D Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.6 QUALITY ASSURANCE

A Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS - APPROVED FOR ALL CATAGORIES

A Carnes, a division of Carnes Company Inc: www.carnes.com/#sle.
B Greenheck Fan Corporation: www.greenheck.com/#sle.
C Loren Cook Company: www.lorencook.com/#sle.
D Twin City Fan & Blower: www.tcf.com/#sle.

2.2 POWER VENTILATORS - GENERAL

A Static and Dynamically Balanced: Comply with AMCA 204.
B Performance Ratings: Comply with AMCA 210, bearing certified rating seal.
C Sound Ratings: Comply with AMCA 301, tested to AMCA 300, bearing certified sound ratings seal.
D Fabrication: Comply with AMCA 99.
E Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.3 ROOF EXHAUSTERS

A Fan Unit: V-belt or direct driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2 inch mesh, 0.62 inch thick aluminum wire birdscreen; square base to suit roof curb with continuous curb gaskets.
B Roof Curb: 24 inch high self-flashing of galvanized steel with continuously welded seams, built-in cant strips.
C Disconnect Switch: Factory wired, nonfusible, in housing for thermal overload protected motor and wall mounted multiple speed switch.
D Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked, and line voltage motor drive, power open, spring return.
E Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm gets attained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.
F Performance Ratings: As indicated on drawings.

2.4 CEILING EXHAUST FANS

A Centrifugal Fan Unit: V-belt or direct driven with galvanized steel housing lined with acoustic insulation, resiliently mounted motor, gravity backdraft damper in discharge.
B Disconnect Switch: Cord and plug-in housing for thermal overload protected motor and control noted on drawing schedule..
C Grille: Molded white plastic.
D Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm is reached with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.
E Accessories
1. Radiation Damper installed in fan assembly.
F Performance Ratings: As indicated on drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A Install in accordance with manufacturer's instructions.
B Secure roof exhausters with cadmium plated steel lag screws to roof curb.
C Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.
D Hung Cabinet Fans:
1. Install fans with resilient mountings and flexible electrical leads, see Section 230548.
2. Install flexible connections between fan and ductwork; see Section 233300. Ensure metal bands of connectors are parallel with minimum 1 inch flex between ductwork and fan while running.
E Install backdraft dampers on inlet to roof and wall exhausters.
F Provide backdraft dampers on outlet from cabinet and ceiling exhauster fans and as indicated.

3.2 SCHEDULES - SEE DRAWING SCHEDULES

END OF SECTION

SECTION 233700
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SECTION INCLUDES

A Diffusers:
B Rectangular ceiling diffusers.
C Registers/grilles:
1. Ceiling-mounted, exhaust and return register/grilles.
2. Ceiling-mounted, supply register/grilles.
3. Wall-mounted, exhaust and return register/grilles.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

A AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2012, with Editorial Revision (2015).
B ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Air Inlets; 2023.

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.
B Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.5 QUALITY ASSURANCE

A Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
B Test and rate louver performance in accordance with AMCA 500-L.
C Provide room schedule and coordinate with general items located in the ceiling and floor. Ceiling items include but are not limited to lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and moldings.
D Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A Metalaire, a brand of Metal Industries Inc: www.metalaire.com/#sle.
B Price Industries: www.price-hvac.com/#sle.
C Ruskin Company: www.ruskin.com/#sle.
D Titus, a brand of Air Distribution Technologies: www.titus-hvac.com/#sle.
E Tuttle and Bailey: www.tuttleandbailey.com/#sle.
F Nailor.

2.2 RECTANGULAR CEILING DIFFUSERS

A Type: Provide rectangular and square formed adjustable, backpan stamped, core removable, and Plaque ceiling diffusers constructed to maintain 360 degree discharge air pattern.
B Connections: Round.
C Frame: Provide surface mount, snap-in, inverted T-bar, and spline type. In plaster ceilings, provide plaster frame and ceiling frame.
D Fabrication: Steel with baked enamel finish.
E Color: As indicated.
F Accessories: Provide radial opposed blade and butterfly volume control damper; plaster ring and gaskets for surface mounted diffusers with damper adjustable from diffuser face.

2.3 CEILING SUPPLY REGISTERS/GRILLES

A Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, two-way deflection.
B Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.
C Construction: Made of aluminum extrusions with factory enamel finish.
D Color: As indicated.
E Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.
F Solid Ceiling Accessory: Provide plaster ring for all diffusers in solid surface ceiling with gaskets.

2.4 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

A Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 45 degrees, vertical face.
B Frame: 1-1/4 inch margin with countersunk screw mounting.
C Fabrication: Steel with 20 gauge, 0.0359 inch minimum frames and 22 gauge, 0.0299 inch minimum blades, steel and aluminum with 20 gauge, 0.0359 inch minimum frame, or aluminum extrusions, with factory baked enamel finish.
D Color: As indicated.
E Solid Ceiling Accessory: Provide plaster ring for all diffusers in solid surface ceiling with gaskets.

2.5 WALL EXHAUST AND RETURN REGISTERS/GRILLES

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A Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with spring or other device to set blades, vertical face.
B Frame: 1-1/4 inch margin with countersunk screw mounting.
C Fabrication: Steel frames and blades, with factory baked enamel finish.
D Color: As indicated on the drawings.
E Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

PART 3 EXECUTION

3.1 INSTALLATION

A Install in accordance with manufacturer's instructions.
B Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.
C Install diffusers to ductwork with air tight connection.
D Provide balancing dampers on duct take-off to diffusers and grilles and registers, despite whether dampers are specified as part of diffuser, or grille and register assembly.

3.2 CLOSEOUT ACTIVITIES

A Demonstrate operational system to Owner's representative.
B Instruct Owner's representative to maintain system and use occupant controls or interfaces, as required.

3.3 PROTECTION

A Protect installed products until completion of project.
B Replace, repair, or touch-up damaged products before Substantial Completion.

END OF SECTION

SECTION 235400
FURNACES

PART 1 GENERAL

1.1 SECTION INCLUDES

A Forced air furnaces.
B Refrigeration Components
C Thermostats.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

A ANSI Z21.47 - American National Standard for Gas-Fired Central Furnaces; 2021.
B ASHRAE Std 103 - Method of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers; 2022.
C NFPA 54 - National Fuel Gas Code; 2024.
D NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
E NFPA 211 - Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances; 2024.

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements, for submittal procedures.
B Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.
C Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.
D Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
E Project Record Documents: Record actual locations of components and connections.

1.5 QUALITY ASSURANCE

A Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.6 WARRANTY

A See Section 017800 - Closeout Submittals, for additional warranty requirements.
B Provide ten year manufacturers warranty for heat exchangers.
C Provide 5 years on integrated circuit boards and integrated ignition parts
D Provide 5 years on draft inducer motor

PART 2 PRODUCTS

2.1 GAS FIRED FURNACES

A Manufacturers:
1. Variable Volume Zoned Systems
a. Carrier Corporation, a brand of United Technologies Corporation Building & Industrial Systems:
2. Constant Volume Systems
a. Daikin
b. Rheem Manufacturing Company Inc: www.rheem.com/#sle.
c. York International Corporation / Johnson Controls: www.york.com/#sle.
B Annual Fuel Utilization Efficiency (AFUE): 0.95 ("condensing") in accordance with ASHRAE Std 103.
C Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating element, controls, air filter, humidifier, and accessories; wired for single power connection with control transformer.
1. Safety certified by CSA in accordance with ANSI Z21.47.
2. Venting System: Direct.
3. Combustion: Sealed.
4. Air Flow Configuration: Multipose or as required per drawings.
5. Heating: Natural gas fired.
6. Intake and Vent Materials
a. Polypropylene Vent UL-1738 Centrotherm or equal
b. PVC System by Ipex UL 1738 along with all rated fittings
c. Standard PVC not approved
7. Accessories:
a. Condensate drain.
b. Roof termination kit
c. Wall termination kit.
d. Provide Manufactured 4" Filter Rack 20x25x4 or
e. Provide furnace return support plenum with Filter 20x25x4
8. Performance:
a. Refer to Furnace Schedule. Gas heating capacities are sea level ratings.
9. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner. Provide pad for furnace as needed to set on combustible floor if applicable.
10. Primary Heat Exchanger:
a. Material: Hot-rolled steel.
b. Shape: Tubular type.
11. Secondary Heat Exchanger:
a. Material: Stainless steel.
b. Shape: Serpentine, clamshell, or tubular.
12. Gas Burner:
a. Atmospheric type with adjustable combustion air supply.
b. Gas valve, variable capacity provides 100 percent safety gas shut-off; 24 volt combining pressure regulation, safety pilot, manual set (On-Off), pilot filtration, automatic electric valve.
c. Electronic pilot ignition, with electric spark igniter.
d. Non-corrosive ECM combustion air blower with permanently lubricated motor.
13. Gas Burner Safety Controls:
a. Thermocouple sensor: Prevents opening of gas valve until pilot flame is proven and stops gas flow on ignition failure.
b. Flame rollout switch: Installed on burner box and prevents operation.
c. Vent safety shutoff sensor: Temperature sensor installed on draft hood and prevents operation, manual reset.
d. Limit Control: Fixed stop at maximum permissible setting, de-energizes burner on excessive bonnet temperature, automatic resets.
14. Supply Fan: Centrifugal type rubber mounted with direct drive.
15. Motor: ECM Motor controlled by integrated furnace blower controller.
16. Air Filters: 4" thick glass fiber, disposable type arranged for easy replacement.
17. Operating Controls:
a. Room Thermostat: Cycles burner to maintain room temperature setting.
b. Supply Fan Control: Energize from bonnet temperature independent of burner controls, with adjustable timed off delay and fixed timed on delay, with manual switch for continuous fan operation. Provide continuous low speed fan operation.
18. Refrigerant Detection
a. Furnaces with R-32 or R454B shall have on board refrigerant detections systems which comply with authority having jurisdiction.

2.2 REFRIGERATION COMPONENTS

A General Refrigeration Component Requirements:
1. Refrigeration compressor, coils, and specialties shall be designed to operate with CFC-free refrigerants.
2. Energy Efficiency: Equal to or greater than prescribed by ASHRAE/IESNA 90.1, "Energy Standard for Buildings except Low-Rise Residential Buildings."
B Refrigerant Coil: Copper tubes mechanically expanded into aluminum fins. Comply with ARI 210/240, "Unitary Air-Conditioning and Air-Source Heat Pump Equipment." Match size with furnace. Include condensate drain pan with accessible drain outlet complying with ASHRAE 62.1.
1. Refrigerant Coil Enclosure: Steel, matching furnace and evaporator coil, with access panel and flanges for integral mounting at or on furnace cabinet and galvanized sheet metal drain pan coated with black asphaltic base paint.
C Refrigerant Line Kits: Annealed-copper suction and liquid lines factory cleaned, dried, pressurized with nitrogen, sealed, and with suction line insulated. Provide in standard lengths for installation without joints, except at equipment connections.
1. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I, 1/2 inch thick.
D Air-Cooled, Compressor-Condenser Unit:
1. Casing: Steel, finished with baked enamel, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
2. Compressor: Hermetically sealed scroll type.
3. Crankcase heater.
4. Vibration isolation mounts for compressor.
5. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
6. Multi-speed compressor motors shall have manual-reset high-pressure switch and automatic-reset low-pressure switch.
a. Minimum two stage compressor or variable speed.
E Refrigerant Charge: Puron, R32, or R-454B
F Refrigerant:
1. R-32 with onboard detection
2. R-454B with onboard detection
G Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.
H Heat-Pump Components: Reversing valve and low-temperature air cut-off thermostat.
I Fan: Aluminum-propeller type, directly connected to motor.
J Motor: Permanently lubricated, with integral thermal-overload protection.
K Low Ambient Kit: Permits operation down to 10 deg F.
L Mounting Base: Polyethylene.
M Capacities and Characteristics: See drawing schedule.
N Compressor-Condenser Unit:
1. Cooling Energy Efficiency (SEER): 15.5.
2. Volts: 208-240.
3. Phase: 1.
4. Hertz: 60.

2.3 THERMOSTATS

A Manufacturers:
1. Carrier Corporation for zone controlled systems.
2. Honeywell Thermostates with wireless access for single zone systems.
B Room Thermostat: Low voltage, electric solid state microcomputer based room thermostat with remote sensor:
1. Honeywell Pro 9000 Smarth Color Touchscreen Thermostat
2. System selector switch (heat-off) and fan control switch (auto-on).
3. Preferential rate control to minimize overshoot and deviation from setpoint.
4. Set-up for four separate temperatures per day.
5. Instant override of setpoint for continuous or timed period from one hour to 31 days.
6. Programming based on weekdays, Saturday and Sunday.
7. Selection features including degree F or degree C display, 12 or 24 hour clock, keyboard disable, remote sensor, fan on-auto.
8. WiFi Capable
9. Battery replacement without program loss.
10. Thermostat Display:
a. Actual room temperature.
b. Programmed temperature.
c. System Mode Indication: Heating, cooling, fan auto, off, and on, auto or on, off.

2.4 EQUIPMENT MOUNTING (WALL AND ROOF)

A Manufacturers
1. DiversiTech
2. Approved Equal
B Roof Mounted Units
1. Materials of Construction
a. Powder Coated Steel
b. Hurrican/Seismic Code Compliant
c. Applications
1) Single Fan Units
2) Dual Fan Units
3) Multi Unit Capability
2. Provide complete manufactured assembly for roof or wall mouting of condensing units.
a. Minimum Height off Roof: 12"
b. Minimum Foot Size: 12x12 with Vibration/Protection pad between foot and roof membrane.
c. Vibration Isolation: High Density elastomeric-coated pre compresssed fiberglass strips which are UV resistant.

PART 3 EXECUTION

3.1 EXAMINATION

A Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.
B Verify that proper power supply is available and located correctly.
C Verify that proper fuel supply is available for connection.

3.2 INSTALLATION

A Install in accordance with manufacturer's instructions and requirements of authorities having jurisdiction.
B Install in accordance with NFPA 90A.
C Install gas fired furnaces in accordance with NFPA 54.
D Install ground-mounted, compressor-condenser components on 4-inch-thick, reinforced concrete base; 4 inches larger on each side than unit. Place unit on premanufactured heat pump stand.
E Provide vent connections in accordance with NFPA 211.
F Mount counterflow furnaces installed on combustible floors on additive base.
G Suspended Units: Suspend from structure using threaded rods, spring hangers, and building attachments. Secure rods to unit hanger attachments. Adjust hangers so unit is level and plumb.
H Base-Mounted Units: Secure units to substrate. Provide optional bottom closure base if required by installation conditions.
1. Anchor furnace to substrate to resist code-required seismic acceleration.
I Vent and Outside-Air Connection, Condensing, Gas-Fired Furnaces: Connect Polypropylene plastic piping vent material to furnace connections and extend outdoors. Terminate vent outdoors with a cap and in an arrangement that will protect against entry of birds, insects, and dirt.
1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
3. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
4. Slope pipe vent back to furnace or to outside terminal.
J Complete installation and startup checks and start units according to manufacturer's written instructions.
K Verify proper operation of capacity control device.
L Adjust airflow and initial temperature and humidity set points.
M Set controls, burner, and other adjustments for optimum heating performance and efficiency. Adjust heat-distribution features, including shutters, dampers, and relays, to provide optimum heating and cooling performance and system efficiency.
N Connect refrigerant tubing kits to refrigerant coil in furnace and to air-cooled, compressor-condenser unit.
1. Flared Joints: Use ASME B16.26 fitting and flared ends, following procedures in CDA's "Copper Tube Handbook."
2. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
3. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
O After completing installation, clean furnaces internally according to manufacturer's written instructions.
P Install new filters in each furnace within 14 days after Substantial Completion.

END OF SECTION

SECTION 235533
FUEL-FIRED UNIT HEATERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A Gas fired unit heaters.

1.2 RELATED REQUIREMENTS

A Section 235100 - Breechings, Chimneys, and Stacks.

1.3 REFERENCE STANDARDS

A ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
B ASHRAE Std 103 - Method of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers; 2022.
C NFPA 54 - National Fuel Gas Code; 2024.
D NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
E NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
F NFPA 211 - Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances; 2024.
G UL (DIR) - Online Certifications Directory; Current Edition.

1.4 SUBMITTALS

A See Section 013000 - Administrative Requirements, for submittal procedures.
B Product Data: Provide manufacturer's literature and data indicating rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.
C Shop Drawings: Indicate assembly, required clearances, and locations and sizes of field connections.
D Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.5 WARRANTY

A See Section 017800 - Closeout Submittals, for additional warranty requirements.
B Provide five year manufacturers warranty for heat exchangers and one year parts and labor for entire unit.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A Comply with NFPA 70.
B Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.

2.2 GAS FIRED UNIT HEATERS

A Manufacturers:
1. Modine Manufacturing Company: www.modine.com/#sle.
2. Sterling HVAC/Mestek Technology, Inc: www.sterlinghvac.com/#sle.
3. Reznor/Thomas & Betts Corporation: www.reznorhvac.com/#sle.
B Unit Heaters: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heat exchanger, burner, controls, and accessories:
1. Heating: Natural gas fired.
2. Discharge Louvers: Individually adjustable horizontal and vertical louvers to match cabinet finish.
C Cabinet: Galvanized steel with baked enamel finish, easily removed and secured access doors, glass fiber insulation and reflective liner.
D Supply Fan: Propeller type with direct drive, variable pitch motor pulley.
E Heat Exchanger: Aluminized steel welded construction.
F Gas Burner:
1. Atmospheric type with adjustable combustion air supply.
2. Gas valve provides 100 percent safety gas shut-off; 24 volt combining pressure regulation, safety pilot, manual set (On-Off), pilot filtration, automatic electric valve.
3. Electronic pilot ignition, with electric spark igniter.
4. Field Convertable for seperated combustion
G Gas Burner Safety Controls:
1. Thermocouple Sensor: Prevents opening of gas valve until pilot flame is proven and stops gas flow on ignition failure.
2. Vent Safety Shutoff Sensor: Temperature sensor installed on draft hood and prevents operation, manual reset.
H Operating Controls:
1. Room Thermostat: Cycles burner to maintain room temperature setting.
2. Supply Fan Control: Energize from bonnet temperature independent of burner controls, with adjustable timed off delay and fixed timed on delay, with manual switch for continuous fan operation.
I Venting Requirements
1. All Exhaust vents shall be run independantly
2. Catagory III Venting Selkirk Saf-T-Vent or Equal
3. Provide Rain cap or side wall cap as approved by Manufacturer
4. Intake combustion air piping shall be single wall sealed galvanized pipe or other approve materials.
5. Concentric venting is allowed utilzied manufacture supplied conversion kits.
J Performance:
1. Ratings: Energy Efficiency Rating (EER)/Coefficient of Performance (COP) not less than requirements of ASHRAE Std 90.1 I-P; seasonal efficiency to ASHRAE Std 103.

2.3 ROOM THERMOSTATS

A Manufacturers:
1. Honeywell: www.honeywell.com/#sle.
2. Johnson Controls, Inc: www.johnsoncontrols.com/#sle.
B Room Thermostat: Adjustable, low voltage, to control burner operation, and supply fan to maintain temperature setting.
C Room Thermostat: Electric solid state microcomputer based room thermostat with remote sensor:
1. Automatic switching from heating to cooling.
2. Preferential rate control to minimize overshoot and deviation from setpoint.
3. Set-up for four separate temperatures per day.
4. Programming based on weekdays, Saturday and Sunday.
5. Thermostat Display:
a. Actual room temperature.
b. Programmed temperature.
c. System Mode Indication: Heating, cooling, system auto-off-on, fan auto-on.

PART 3 EXECUTION

3.1 EXAMINATION

2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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A Verify that space is ready for installation of units and openings are as indicated on shop drawings.
B Verify that proper power supply is available.
C Verify that proper fuel supply is available for connection.

3.2 INSTALLATION

A Install in accordance with NFPA 90A.
B Install gas fired units in accordance with NFPA 54 and applicable codes.
C Provide vent connections in accordance with NFPA 211. Refer to Section 235100.

END OF SECTION

SECTION 238200

CONVECTION HEATING AND COOLING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A Electric unit heaters.
B Electric cabinet unit heaters.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

A AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils; 2001, with Addenda (2011).
B UL 674 - Electrical Motors and Generators for Use in Hazardous (Classified) Locations; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A Preinstallation Meeting: Conduct a preinstallation meeting prior to the start of the work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

A See Section 013000 - Administrative Requirements for submittal procedures.
B Product Data: Provide typical catalog of information including arrangements.
C Shop Drawings:
1. Submit schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and comparison of specified heat required to actual heat output provided.
D Certificates: Certify that coils are tested and rated in accordance with AHRI 410.
E Manufacturer's Instructions: Indicate installation instructions and recommendations.
F Project Record Documents: Record actual locations of components and locations of access doors in radiation cabinets required for access or valving.
G Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listings.
H Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
B Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.7 WARRANTY

A See Section 017800 - Closeout Submittals for additional warranty requirements.
B Provide 1 year manufacturer's warranty for Entire Unit.

PART 2 PRODUCTS

2.1 ELECTRIC UNIT HEATERS

A Manufacturers:
1. INDEECO (Industrial Engineering and Equipment Company): www.indeeco.com/#sle.
2. Modine Manufacturing Company: www.modineHVAC.com/#sle.
B Provide products listed, classified, and labeled by Underwriters Laboratories Inc. (UL), Intertek (ETL), or testing firm acceptable to authority having jurisdiction as suitable for purpose indicated.
C Heating Element Assembly:
1. Thermal safety cut-out within electric terminal box with automatically reset switch located near electric terminal box.
2. Horizontal Projection Units:
a. Nickel chromium resistance wire surrounded with magnesium oxide and sheathed in steel, spiral-finned tubes.
3. Vertical Projection Units:
a. Nickel chromium resistance wire surrounded with magnesium oxide and sheathed in steel, spiral-finned tubes.
D Housing:
1. Suitable for ceiling or high altitude mount using provided hardware appendages.
2. Horizontal Projection Units:
a. Construction materials to consist of heavy gauge steel with galvanized, polyester powder coat, or high gloss baked enamel finish.
b. Provide with threaded holes for threaded rod suspension.
c. Provisions for access to internal components for maintenance, adjustments, and repair.
3. Vertical Projection Units:
a. Construction materials to consist of heavy gauge steel with polyester powder coat or high gloss baked enamel.
b. Provide with mounting support brackets or provisions for mounting from ceiling or structure above.
c. Provisions for access to internal components for maintenance, adjustments, and repair.
E Air Inlets and Outlets:
1. Inlets: Provide stamped louvers.
2. Outlets: Provide directional louvers.
F Fan: Factory balanced, direct drive, axial type with fan guard.
G Motor: Totally enclosed, thermally protected, and provided with permanently lubricated bearings.
H Controls:
1. Remoteline-voltage thermostat.
I Electrical Characteristics: See Drawings Schedule

2.2 ELECTRIC CABINET UNIT HEATERS

A Manufacturers:
1. INDEECO (Industrial Engineering and Equipment Company): www.indeeco.com/#sle.
2. Marley Engineered Products: www.marleymep.com/#sle.
B Provide products listed, classified, and labeled by Underwriters Laboratories Inc. (UL), Intertek (ETL), or testing firm acceptable to authority having jurisdiction as suitable for purpose indicated.
C Heating Elements: Provide open-wire, finned tubular, or resistance wire enclosed in steel sheath.
D Cabinet:
1. Minimum 18 gauge, 0.0478 inch thick steel front panel with exposed corners and edges rounded, easily removed panels, glass fiber insulation and integral air outlet, and inlet grilles.
2. Provide required hardware accessories for ceiling, duct, recessed, semi-recessed, surface, or wall mounting.
E Finish:
1. Factory applied, painted finish.
2. Color: As indicated on drawings.
F Fan: Factory balanced, direct drive, axial type with fan guard connected to totally enclosed, thermally protected motor with permanently lubricated bearings, and thermal cutout switch with automatic reset to de-energize electric heating elements in the event of overheating.
G Controls:
H Filter: Easily removed, 1 inch thick glass fiber throw-away type, located to filter air before coil.
I Electrical Characteristics: See Drawings Schedule

PART 3 EXECUTION

3.1 EXAMINATION

A Verify that surfaces are suitable for installation.
B Verify that field measurements are as indicated on drawings.

3.2 PREPARATION

3.3 INSTALLATION

A Install in accordance with manufacturer's recommendations.
B Install equipment exposed to finished areas after walls and ceilings are finished and painted.
C Do not damage equipment or finishes.
D Baseboard Radiation:
1. Locate on outside walls and run cover continuously wall-to-wall unless otherwise indicated.
2. Center elements under window with elements of equal length centered under each window for multiple windows.
3. Install end caps where units butt against walls.
E Finned Tube Radiation:
1. Locate on outside walls and run cover continuously wall-to-wall unless otherwise indicated.
2. Center elements under window with elements of equal length centered under each window for multiple windows.
3. Align cabinet joints with window mullions.
4. Install wall angles where units butt against walls and align cabinet joints with window mullions.

3.4 FIELD QUALITY CONTROL

A See Section 014000 - Quality Requirements for additional requirements.

3.5 CLEANING

A After construction and painting is completed, clean exposed surfaces of units.
B Vacuum clean coils and inside of units.
C Touch-up marred or scratched surfaces of factory-finished cabinets using finish materials furnished by the manufacturer.
D Provide and Install new filters.
E Run Heaters for burn in or until

3.6 PROTECTION

A Provide finished cabinet units with protective covers during the balance of construction.

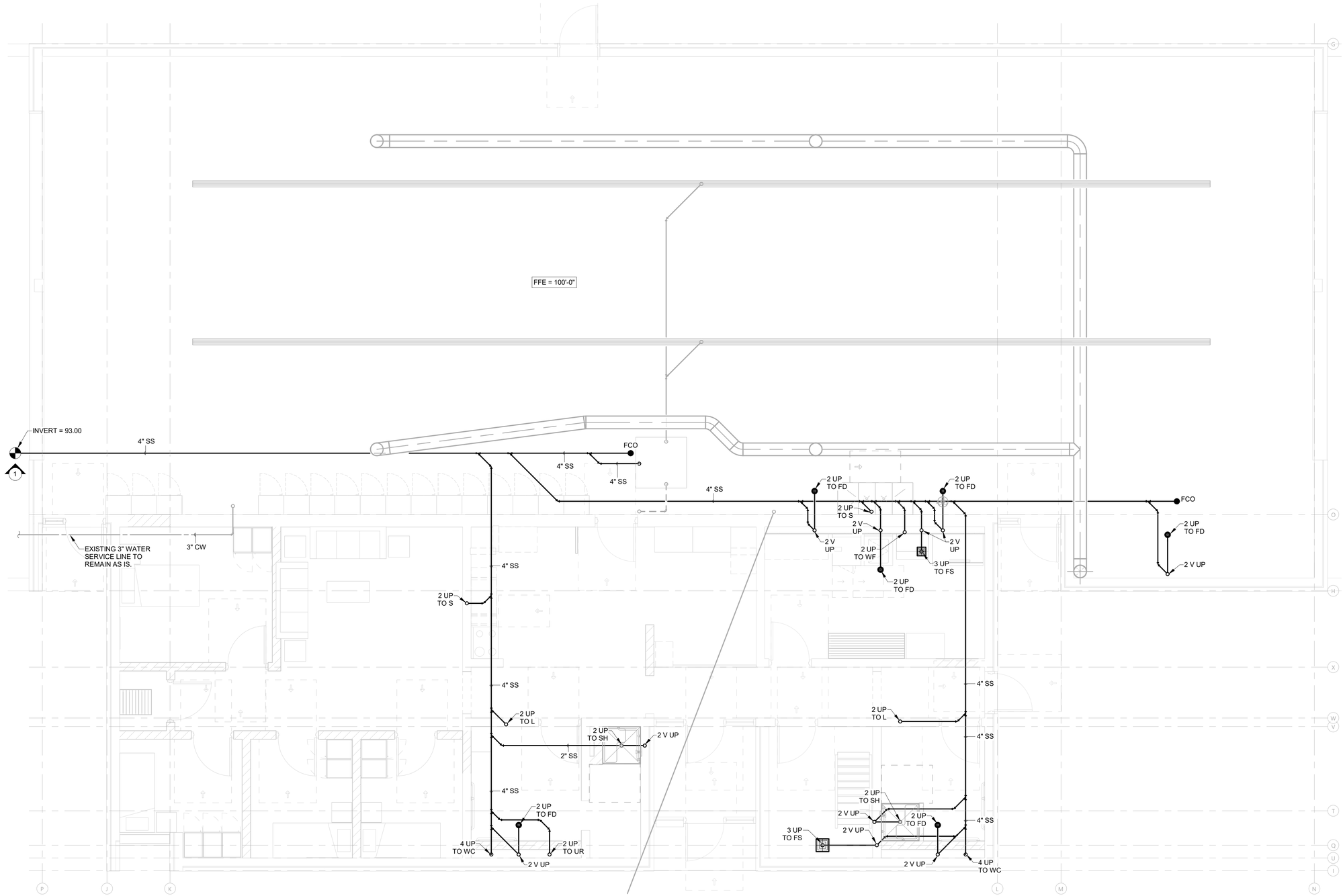
3.7 EQUIPMENT SCHEDULES: SEE DRAWINGS

END OF SECTION

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PLUMBING KEY NOTES:

1. POINT OF CONNECTION. CONNECT NEW 4" SS TO EXISTING AT APPROXIMATELY THIS LOCATION. FIELD VERIFY EXACT CONNECTION POINT.



1 M1.00 PLUMBING - UNDERFLOOR
1/4" = 1'-0"

N

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EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

PLUMBING PLAN - UNDERFLOOR

M1.00

PROJECT #: 2025-10872

2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

PLUMBING KEY NOTES:

1. ROUTE 2" CW DOWN TO 5'-0" AFF AND TERMINATE WITH OWNER APPROVED FITTING FOR TANK WATER FILL LINE.
2. REPLACE EXISTING COLD WATER SHUTOFF VALVE ON MAIN LINE FEEDING THE OFFICE AREA.
3. EXISTING GAS METER. NEW LOAD 1697 MBH @ 2 PSI. CONTRACTOR SHALL COORDINATE WITH LOCAL UTILITY AND PAY FOR ALL FEES, MATERIALS, LABOR, ETC. TO ACCOMMODATE EXISTING METER MODIFICATION.

1" G UP
1" G
ROUTE 1"G UNDERGROUND AND UP TO GENERATOR. INSTALL PER 4/M1.02
3/4" G
1/2" G
1/2" G
GUH-1
GUH-2
2" CW
2" CW
2" CW
2" CW
APPARATUS ROOM 108
S-1
FD-2
SH-2
ESE-1
FD-2
WF-1
1/2" MANUAL BALANCE VALVE
FD-1
FD-2
2 V UP TO 3 VTR
KITCHEN/OFFICE 105
ADA BEDROOM 107.1
LIVING ROOM 107
CONNECT TO EXISTING VTR IN APPROXIMATELY THIS LOCATION
S-1
1/2" MANUAL BALANCE VALVE
WASH 104
3/4" RHW
1 1/4" HW
I.T. CLO. 107.5
CORRIDOR 101
3/4" RHW
3/4" RHW
L-1
2" V
SH-1
2 V UP TO 3 VTR
RESTROOM 106
2" V
VEST 100
3/4" G UP
STORAGE 102
1 1/4" HW
RESTROOM 103
SH-1
WC-1
FD-1
1/2" HW
L-1
2" V
BEDROOM 107.2
BEDROOM 107.3
BEDROOM 107.4
WC-1
FD-1
1" CW
2" V
UR-1
DET-1
HWH-1
FS-1
1/2" CW
1" CW
RCP-1
CONNECT NEW VENTS TO EXISTING VTR IN APPROXIMATELY THIS LOCATION

1 M1.01 PLUMBING - FIRST FLOOR
1/4" = 1'-0"

N

2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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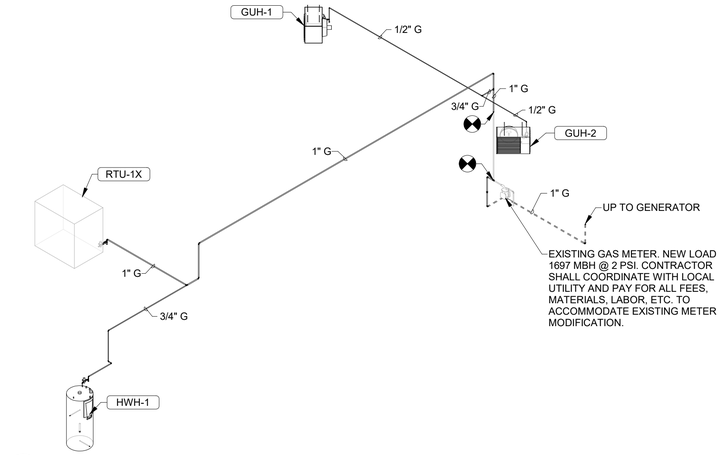
EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

PLUMBING PLAN - FIRST FLOOR

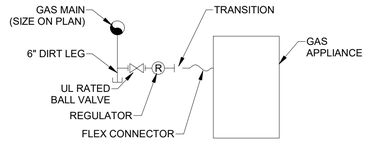
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PROJECT #: 2025-10872

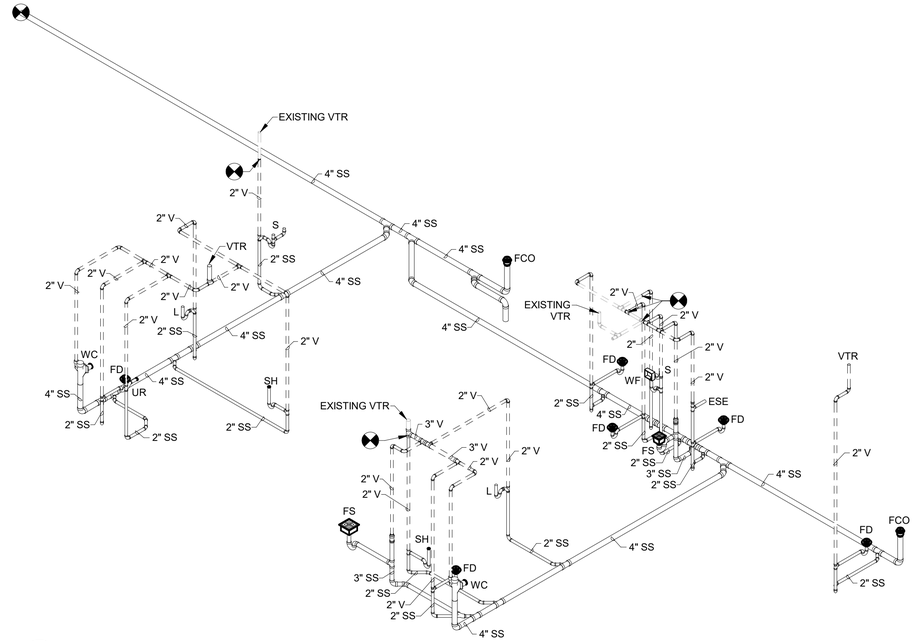
GAS APPLIANCE LOAD		
FIXTURE	**LOAD (MBH)**	**PIPE SIZE (DOWNSTREAM REGULATOR)**
F-1	120	1"
UH-1	180	1 1/4"
UH-2	180	1 1/4"
WH-1	399	1 1/2"
GENERATOR	818	2"
TOTAL MBH	1697	



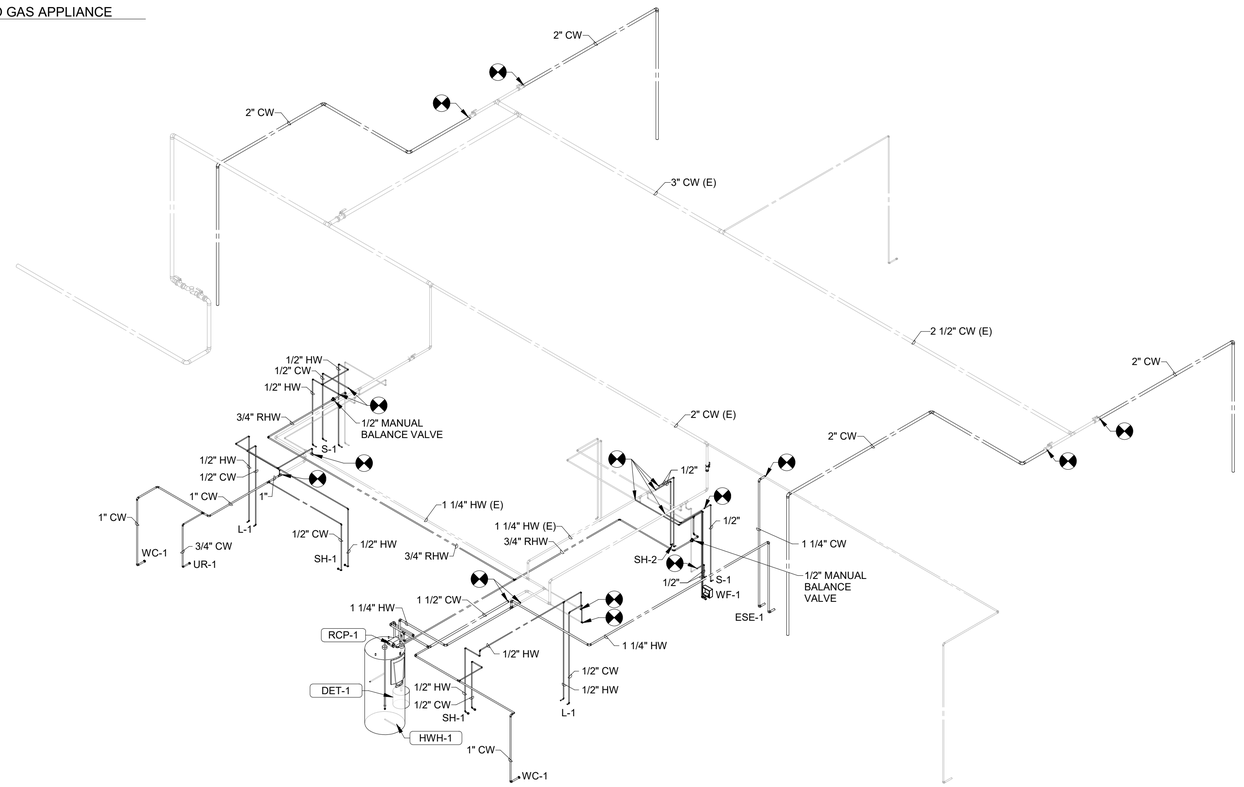
3 M1.02 GAS RISER DIAGRAM
NO SCALE



4 M1.02 TYPICAL CONNECTION TO GAS APPLIANCE
NO SCALE



1 M1.02 WASTE & VENT RISER DIAGRAM
NO SCALE



2 M1.02 DOMESTIC WATER RISER DIAGRAM
NO SCALE

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EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

PLUMBING DIAGRAMS

M1.02

PROJECT #: 2025-10872

2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

MECHANICAL KEY NOTES:

1. ALL CONTROL CABLING IN EXPOSED CEILING OR ABOVE INACCESSIBLE CEILING AREAS SHALL BE INSTALLED IN CONDUIT. WHERE CONTROL CABLING IS INSTALLED ABOVE ACCESSIBLE CEILINGS, IT MAY RUN FREE-AIR AND PROPERLY SUPPORTED PER CODE. SEE DIV. 26 FOR CONDUIT REQUIREMENTS.

DUCTWORK SHADE LEGEND

- ALUMINUM DUCT
- LINED DUCT
- 2" DOUBLE WALL DUCTWORK WITH PERFORATED FACE MYLAR LINER

L-1
2800 CFM
30"x30"

GD-1.1

GUH-1

GUH-2

GD-1.2

TO EF-4

2
M3.00

26"X16" EA

26"X16" EA UP
TO EF-4

APPARATUS
ROOM
108

ADA BEDROOM
107.1

S-1
130 CFM
8"Ø

8"Ø SA

6"Ø EA UP
TO GOOSENECK

EUH-6

EF-3

6"Ø EA

I.T. CLO.
107.5

EUH-5

6"Ø SA

BEDROOM
107.2

S-1
150 CFM
6"Ø

LIVING ROOM
107

S-2
130 CFM
8"Ø

10"X10" EA UP TO
GOOSENECK

10"x10" EA

RTU-1X

10"x10" SA

12"x10" SA

14"x10" SA

EUH-4

EUH-3

BEDROOM
107.3

BEDROOM
107.4

S-1
100 CFM
6"Ø

KITCHEN/OFFICE
105

S-2
200 CFM
8"Ø

8"x8" SA

10"Ø SA

16"x10" SA

S-1
75 CFM
6"Ø

RESTROOM
106

VEST
100

EUH-1

EF-1

CORRIDOR
101

GD-1

WASH
104

S-1
170 CFM
8"Ø

4"Ø EA

S-1
150 CFM
8"Ø

EUH-2

STORAGE
102

RESTROOM
103

4"Ø WATER
HEATER VENTS
UP

HWH-1

EF-2

EF-4

16"x26" EA

E-1
1400 CFM
24"x30"

16"x26" EA

E-1
1400 CFM
24"x30"

1'-6"

N

1 M3.00 HVAC PLAN - FIRST FLOOR
1/4" = 1'-0"

2 M3.00 EXHAUST SECTION
1/4" = 1'-0"

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

2025-10872

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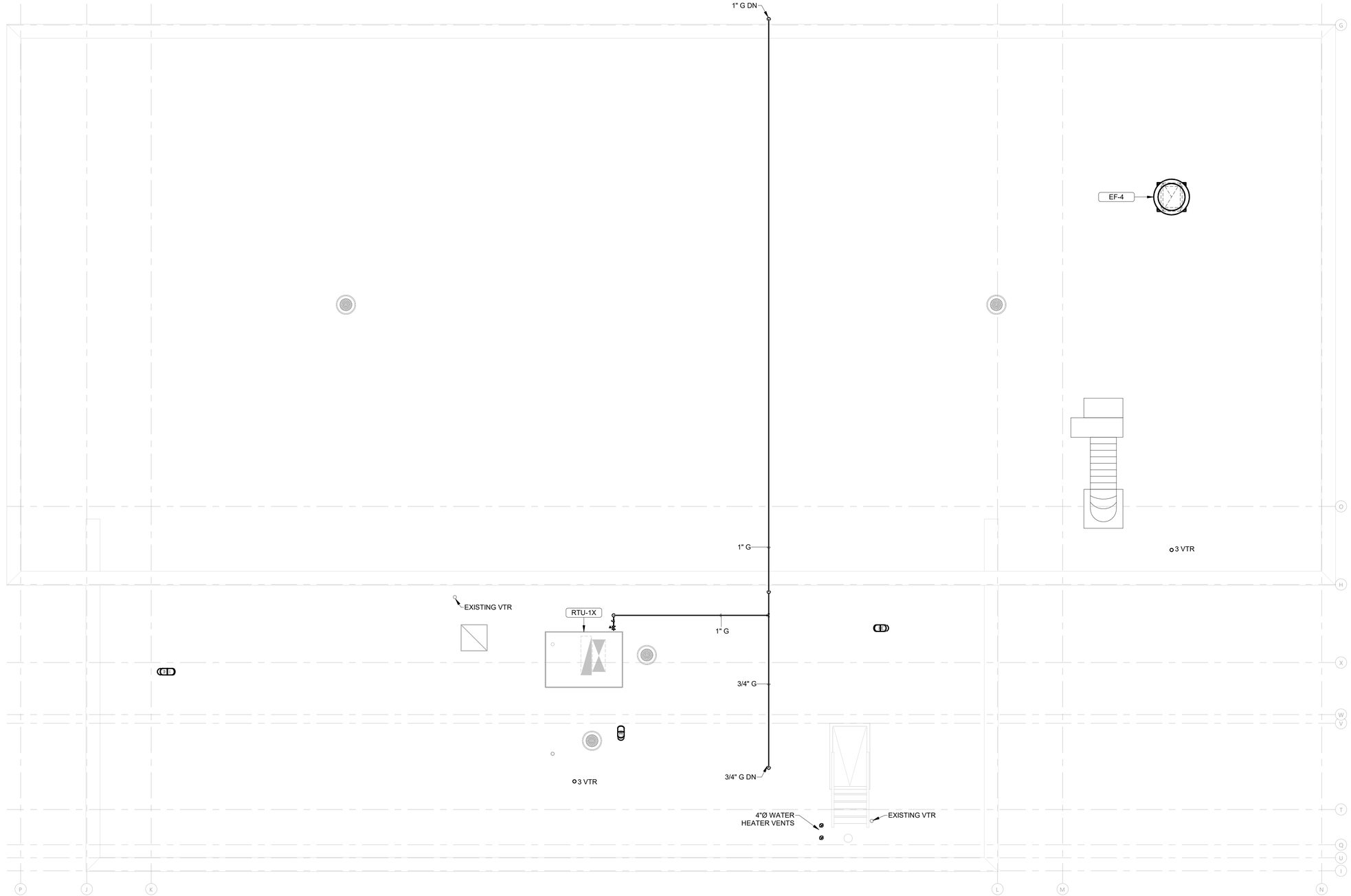
548

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

HVAC PLAN - FIRST FLOOR

M3.00

PROJECT #: 2025-10872



1 M3.01 HVAC PLAN - ROOF
1/4" = 1'-0"

N

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HVAC PLAN - ROOF

M3.01

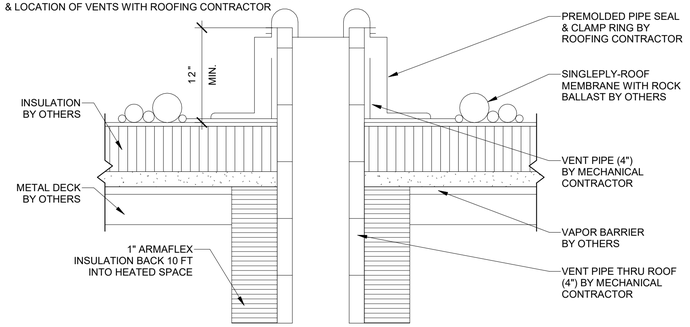
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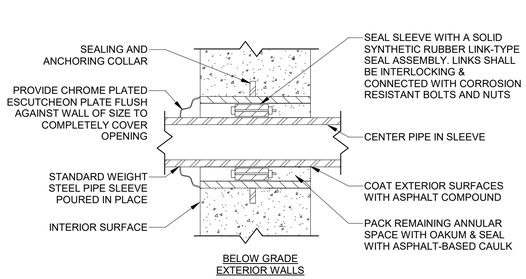
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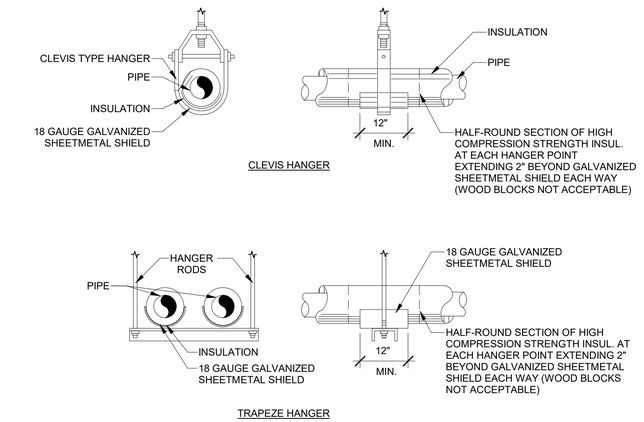
NOTE:
MECHANICAL CONTRACTOR SHALL COORDINATE QUANTITY & LOCATION OF VENTS WITH ROOFING CONTRACTOR



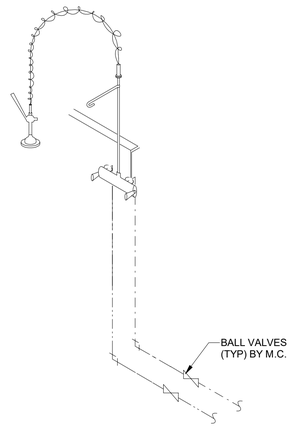
6 M5.00 VENT THRU ROOF DETAIL
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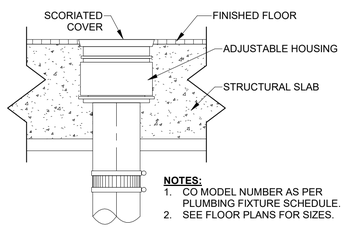
7 M5.00 LINK SEAL SLEEVE DETAIL
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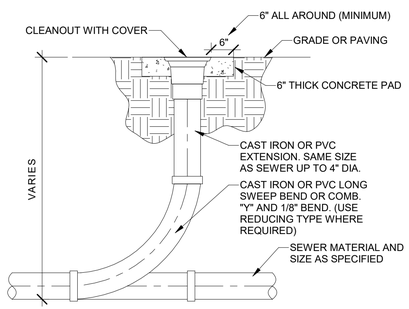
8 M5.00 TYPICAL PIPE HANGERS
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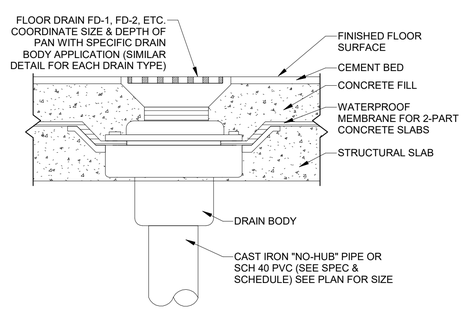
9 M5.00 FAUCET PIPING DIAGRAM
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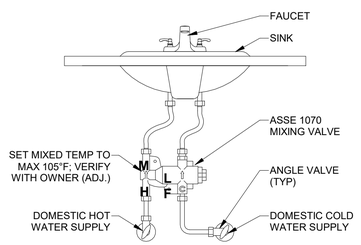
1 M5.00 INTERIOR CLEANOUT DETAIL
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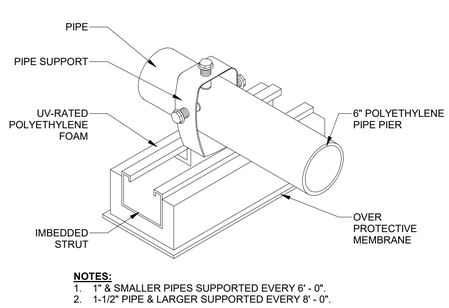
2 M5.00 EXTERIOR CLEANOUT DETAIL
NO SCALE



3 M5.00 FLOOR DRAIN DETAIL
NO SCALE



4 M5.00 THERMOSTATIC MIXING VALVE DETAIL
NO SCALE



5 M5.00 PIPE PEIR DETAIL
NO SCALE

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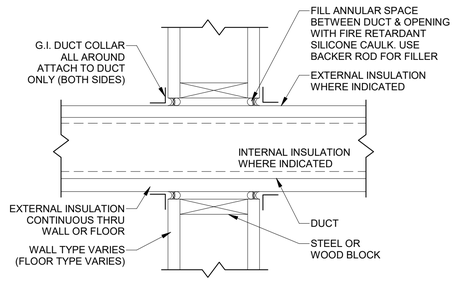
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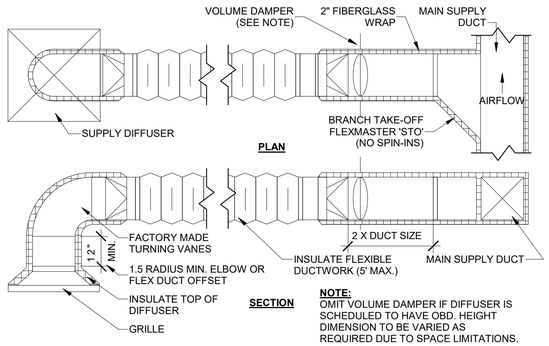
PLUMBING DETAILS

M5.00

PROJECT #: 2025-10872

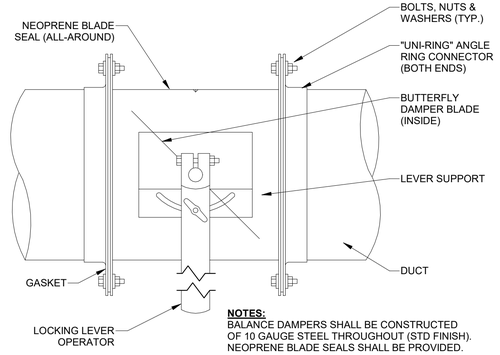


5 M5.01 DUCT SLEEVE DETAIL (NON-FIRE RATED)
NO SCALE



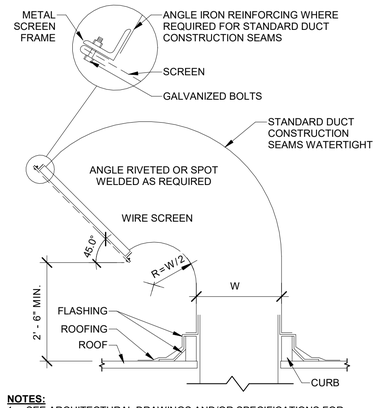
NOTE:
OMIT VOLUME DAMPER IF DIFFUSER IS SCHEDULED TO HAVE OBD. HEIGHT DIMENSION TO BE VARIED AS REQUIRED DUE TO SPACE LIMITATIONS.

1 M5.01 FLEXIBLE CONNECTION TO DIFFUSER DETAIL
NO SCALE



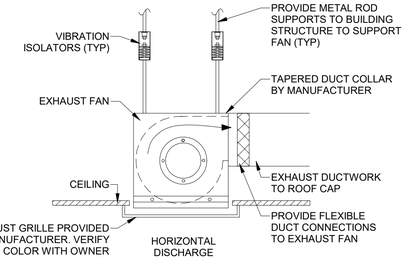
NOTES:
BALANCE DAMPERS SHALL BE CONSTRUCTED OF 10 GAUGE STEEL THROUGHOUT (STD FINISH). NEOPRENE BLADE SEALS SHALL BE PROVIDED.

2 M5.01 BALANCE DAMPER DETAIL
NO SCALE



NOTES:
1. SEE ARCHITECTURAL DRAWINGS AND/OR SPECIFICATIONS FOR CURB, FLASHING, & ROOFING.
2. WHEN WOOD PLATE IS PROVIDED AROUND TOP OF CURB, SECURE FLASHING & GOOSENECK TO WOOD PLATE WITH 3/8" CADMIUM PLATED LAG BOLTS NOT OVER 12" ON CENTERS.
3. OPENING SHALL BE DUCT SIZE PLUS 25%.

3 M5.01 GOOSENECK DETAIL
NO SCALE



4 M5.01 CEILING MOUNTED EXHAUST FAN DETAIL
NO SCALE

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MARTIN MECHANICAL DESIGN INC.
FARGO GRAND FORKS PARK RAPIDS
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DRAWN BY: MJ
CHECKED BY: JL

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

551

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

MECHANICAL DETAILS

M5.01

PROJECT #: 2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL
2025-10872

WATER HEATER SCHEDULE

TAG	WH-1		
SERVES	OFFICE		
FUEL SOURCE	GAS		
MANUFACTURER	LOCHINVAR		
MODEL NAME	SHIELD		
MODEL NUMBER	SWR285N		
TANK CAPACITY	116 GAL.		
GALLONS/HOUR	328 @ 100%%d F RISE		
TANK TEMP. SETPOINT	140°F		
INPUT	285 MBH		
VOLTAGE	120/1/60		
REMARKS	2,3,4,5,9,10,11,12		

NOTES:
1. ASME.
2. 3/4" T&P RELIEF VALVE.
3. GAS SHUTOFF DEVICE.
4. ELECTRONIC LOW WATER CUTOFF.
5. MANUAL RESET HIGH LIMIT.
6. BUILDING AUTOMATION SYSTEM CONNECTION.
7. AQUAPLEX STORAGE TANK AND FIRE TUBES FOR BOTH WATER HEATERS.
8. 15 YEAR TANK WARRANTY, HEAT EXCHANGER AND CHLORIDE CRACKING ON CONQUEST.
9. NO ANODE RODS REQUIRED.
10. ASHRAE/IES901b-1992.
11. 97% THERMAL EFFICIENT.
12. W/DIGITAL DISPLAY PANEL.

SINK SCHEDULE (S)

TAG	KS-1	S-1
MAKE	JUST	JUST
MODEL	DL-2133-A-GR	SB136-24RL-2-J
FIXTURE MATERIAL	STAINLESS STEEL	STAINLESS STEEL
FAUCET MFGR. & NO.	DELTA B4410LF	T&S BRASS B-0133-ADF12-B
STRAINER	J-35's	J-35's
DRAIN LOCATION	CENTER	CENTER
*OUTSIDE DIMENSION	33x21	84"x27.5"
*INSIDE DIMENSION	14x16	N/A
DEPTH	10 1/2"	14"
REMARKS	1,2,4,6,7,8,9	1,2,4,6

NOTES:
1. 3/8" FLEX. H&C WATER SUPPLIES.
2. ANGLED WHEEL STOPS.
3. ANGLED KEYED STOPS.
4. 17 GA CHROME P-TRAP W/CLEANOUT.
5. CAST IRON OR PVC TRAP W/CLEANOUT.
6. NO OF HOLES & SPACING AS REQ. BY FAUCET.
7. SOUND DEADENING ON UNDERSIDE.
8. SELF-RIMMING W/BACK LEDGE FOR FAUCET.
9. ASSE 1070 THERMOSTATIC MIXING VALVE

* LENGTH (FRONT TO BACK) x WIDTH (LEFT TO RIGHT)

LAVATORY SCHEDULE (L)

TAG	L-1	
MAKE	KOHLER	
MODEL NAME	PENNINGTON	
MODEL NUMBER	K-2196	
FIXTURE MATERIAL	VITREOUS CHINA	
FAUCET MAKE & MODEL NO	DELTA 22C151	
FIXTURE COLOR	WHITE	
REMARKS	1,2,4,6,8,9,10,12,14,16,17,18	

NOTES:
1. FLEX. SUPPLIES FOR H&C WATER
2. WHEEL ANGLED STOPS
3. KEYED ANGLED STOPS
4. 17 GA CHROME P-TRAP
5. WALL HUNG W/ CARRIER
6. HOLES TO MATCH FAUCET
7. 120 V ELECTRONIC SENSOR W/24 VOLT TRANSFORMER
8. ESCUTCHEONS
9. ASSE 1070 THERMOSTATIC MIXING VALVE
10. INSULATED DRAIN & SUPPLIES
11. BATTERY OPERATED SENSOR
12. EXTENDED LEVER HANDLE
13. OVAL BOWL
14. OPEN GRID DRAIN
15. POP-UP WASTE ASSEMBLY
16. FRONT OVERFLOW
17. FAUCET LEDGE
18. COUNTER MOUNTED
19. 29" CLEAR TO BOTTOM OF APRON
20. 32" TO RIM

SHOWER SCHEDULE (SH)

TAG	SH-1 (ADA)	SH-2 (ADA)
MANUFACTURER	WARM RAIN	SHOWER VALVE AND HEADS ONLY
MODEL NUMBER	WR-3636	
FIXTURE MATERIAL	ACRYLIC	
NOMINAL DIMENSIONS	36" x 36" (CENTER DRAIN)	
FRONT THRESHOLD HEIGHT	1/2" BARRIER FREE	
CONTROLS/HD NAME	DELTA TOUCH-CLEAN	DELTA TOUCH-CLEAN
CONTROLS MODEL NAME	MONITOR 13 SERIES	MONITOR 13 SERIES
CONTROLS NUMBER	T13H332	T13H332
ROUGH-IN	R10700-UNWS	R10700-UNWS
REMARKS	1,2,3,4,5,6,7,9,10,11,12,13,15	1,2,3,4,5,6,7,9,10,11,12,13,15

NOTES:
1. PRESSURE/ TEMP. BALANCED/ANTI-SCALD.
2. INSTALL HEAD W/ROUGH IN AT 6' 6" W/ARM AND FLANGE ABOVE SURROUND.
3. HEAD SHALL BE 42" TO 72" (ADJ.) ABOVE FLOOR .
4. 69" DOUBLE SPIRAL METAL HOSE.
5. MOUNT CONTROLS PER ADA REQ.
6. SLIP RESISTANT.
7. L-SHAPED WHITE FOLDUP SEAT.
8. VACUUM BREAKER/24" LONG 1 1/2" DIAMETER SLIDE BAR.
9. SHOWER DRAIN.
10. SHOWER CURTAIN WITH WEIGHTS BY G.C.
11. SHOWER ROD BY G.C.
12. GRAB BARS BY M.C. (SEE ARCHITECTURAL FOR LENGTHS AND PLACEMENT).
13. PROVIDE COLLAPSIBLE DAM FOR SHOWER.
14. 3 YEAR WARRANTY ON SHOWER.
15. PROVIDE WITH ASSE 1016 PRESSURE BALANCE MIXING VALVE.

WATER CLOSET SCHEDULE (WC)

TAG	WC-1 (ADA)		
MAKE	KOHLER		
MODEL NUMBER	KINGSTON		
MODEL NAME	K-4330		
FIXTURE MATERIAL	VITREOUS CHINA		
TYPE	F.V. H.C. W.H.		
FLUSH VALVE MAKE & MODEL NO	SLOAN ROYAL #111		
FIXTURE COLOR/R.I.	WHITE		
WATER CLOSET SEAT NUMBER	CHURCH 9500SSC		
SEAT COLOR	WHITE		
REMARKS	2,3,5,9,10,11,14		

NOTES:
1. PRESSURE ASSISTED.
2. ELONGATED BOWL.
3. OPEN FRONT SEAT.
4. OPEN FRONT SEAT W/COVER.
5. 1.6 GAL/FLUSH.
6. ANGLED SUPPLY W/WHEEL STOP.
7. ANGLED SUPPLY W/KEYED STOP.
8. CLOSE COUPLED TANK.
9. HANDICAPPED HEIGHT/BARRIER FREE/ADA COMPLIANT.
10. SELF SUSTAINING CHECK HINGE.
11. FLUSH VALVE ON OPEN SIDE.
12. BATTERY POWERED.
13. HARD WIRED W/TRANSFORMER.
14. W/CARRIER.

SHOWER/EYEWASH SCHEDULE

TAG	ESE-1	
MAKE	STINGRAY	
MODEL	S5510	
FIXTURE MATERIAL	ABS & SS	
OPERATION	PULL HANDLE/PADDLE	
SCALD PROTECTION VALVE	LAWLER 911E	
REMARKS	1,2,3,4,5,6	

NOTES:
1. 1/2" STAY OPEN BALL VALVE.
2. WALL BRACKET AND DETAILS.
3. PROVIDE STAND.
4. TEMPERING VALVE PROVIDED WITH SHOWER
5. PROVIDE SHOWERS WITH #9010 TEST BAGS.
6. 10" ABS PLASTIC HEADS, STAINLESS STEEL BOWL, CHROME PLATED FLOW CONTROL, TEMPERING VALVE, SAFETY STRIPES AND LABELS. WITH 30"x30" BASE UNIT WITH ACTUATING GRATE.

DOMESTIC EXPANSION TANK

TAG	DET-1	
MAKE	BELL & GOSSETT	
MODEL	PTA-5V	
SYSTEM	DOMESTIC WATER	
STYLE	DIAPHRAGM	
DIAPHRAM MAT	HEAVY DUTY BUTYL	
TANK VOLUME	3.5	
MAX ACCEPT. VOL.	2.3	
TANK PRESSURE	60 PSI	
MAX PRESSURE	125 PSI	
OPERATING WEIGHT	22	
DIMENSIONS	10"DIAx14"	
REMARKS	1,2,3,4	

NOTES:
1. PROVIDE PRESSURE GAGE
2. 1 YEAR TANK WARRANTY
3. ASME RATED TANK
4. PROVIDE SIGHT GLASS

FLOOR DRAIN/SINK SCHEDULE (FD)

TAG	FD-1	FD-2	FS-1
MAKE	JR SMITH	JOSAM	JR SMITH
MODEL	2005	32100-AE-81	3420
ADJUST. STRAINER	N.B. TOP	SQ. C.I. TOP	SQ. C.I. TOP
CAST IRON BODY	YES	YES	YES
TRENCH DIMENSIONS	NA	2,5,8	NA
REMARKS	5,8	2,6,8	2,6,8

NOTES:
1. PRIMER TAP.
2. SEDIMENT BUCKET.
3. WITH LINT BASKET AS DETAILED ON DRAWINGS.
4. WITH INTEGRAL CLEANOUT.
5. VANDAL PROOF SCREWS.
6. WITH FUNNEL.
7. WITH INTEGRAL BACKWATER VALVE.
8. CLAMPING COLLAR WHERE REQUIRED.

DOMESTIC RECIRCULATING PUMP SCHEDULE

TAG	RCP-1	
MAKE	BELL & GOSSETT	
MODEL	PL-55	
STYLE	IN-LINE	
GPM	3	
FT-HEAD	15	
MOTOR HP	0.5	
VOLTS/PH	120V/60C/1PH	
RPM	3250	
CONTROL	AQUASTAT/TIMER	
REMARKS	1,2	

NOTES:
1. COORDINATE WITH DIV 16 FOR ELECTRICAL.
2. BRONZE FITTED FOR DOMESTIC WATER USE.

WASHER FITTING SCHEDULE (WF)

TAG	WF-1
MAKE	OATEY
MODEL	38540
REMARKS	1,2,3,4,5,6

NOTES:
1. METAL RECESSED BOX.
2. HOT & COLD WATER W/SHUTOFFS.
3. 2" DRAIN.
4. W/ WATER HAMMER ARRESTORS.
5. W/BOTTOM SUPPLIES.
6. WHITE POWDER.

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UNIT HEATER SCHEDULE

TAG	GUH-1	GUH-2	
MANUFACTURER	MODINE	MODINE	
MODEL	EFFINITY PTC180	EFFINITY PTC180	
INPUT	180 MBH	180 MBH	
OUTPUT	167.4 MBH	167.4 MBH	
VOLTAGE	120/1/60	120/1/60	
FLA	6.75	6.75	
MAX OVER CURRENT	15	15	
FUEL	NAT. GAS	NAT. GAS	
GAS CONNECTION SIZE	0.5	0.5	
NO STAGES	1 STAGE	1 STAGE	
CFM	2242	2242	
INTAKE DIAMETER	4	4	
VENT DIAMETER	4	4	
WEIGHT	215 LBS	215 LBS	
REMARKS	SEE NOTES	SEE NOTES	

NOTES
1. HANG FROM CEILING WITH VIBRATION ISOLATORS
2. PROVIDE INSULATED THERMOSTAT BASE
3. PROVIDE TEFC MOTOR
4. PROVIDE ALUMINUM HEAT EXCHANGER
5. INSTALL SEPARATE COMBUSTION AIR AND VENT PER MANUF. INSTRUCTION

VENTILATION CONTROL SYSTEM SCHEDULE

TAG	VCS-1
MAKE	HONEYWELL
MODEL	E3 POINT
GAS DETECTION	O2
WARRANTY	2 YEARS
REMOTE SENSORS	YES
MODEL	O2
NUMBER	1
CONTROLLER MOUNTING HEIGHT	48" AFF
SENSOR MOUNTING HEIGHT	60" AFF
	120/1/60
REMARKS	1

NOTES:
1. SENSORS SHALL BE TIED TO EXHAUST FAN. PROVIDE VENTILATION CONTROL SYSTEM WITH POWER ON LED, 02 ALARM, CONDITION LED FOR EACH SENSOR, FAN ON LED (ONE FOR EACH OUTPUT), LOCAL ALARM HORN AND LIGHT WITH SILENCE SWITCH, SENSOR POWER INDICATION, KEYED PANEL LOCK, MANUAL FAN OPERATION OVERRIDE SWITCH, AND ANY MISC. RELAYS, ETC. FOR A COMPLETE AND OPERABLE INSTALLATION. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND TERMINATING ALL CONDUIT AND WIRING IN ITS ENTIRETY.

ELECTRIC UNIT HEATER SCHEDULE

TAG	EUH-1	EUH-2	EUH-3	EUH-4	EUH-5	EUH-6	
MAKE	REZNOR	QMARK	REZNOR	REZNOR	REZNOR	REZNOR	
MODEL	EMC 4	QCH1151F	EMC 4	EMC 4	EMC 4	EMC 4	
VOLTAGE	208/1	120/1	208/1	208/1	208/1	208/1	
AMPS	19.23	12.5	19.23	19.23	19.23	19.23	
WATTS	4000	1500	4000	4000	4000	4000	
HEAT OUTPUT	13661	5199	13661	13661	13661	13661	
REMARKS	1	2	1	1	1	1	

NOTES:
1. COLOR BY ARCHITECT. PROVIDE TAMPER PROOF COVER, SURFACE MOUTING FRAME, INTEGRAL DISCONNECT, AND INTEGRAL THERMOSTAT.
2. PROVIDE T BAR FRAME KIT, THERMOSTAT, AND INTEGRAL DISCONNECT

CEILING EXHAUST FAN SCHEDULE

TAG	EF-1	EF-2	EF-3	EF-4
MAKE	COOK	COOK	COOK	COOK
MODEL	GC-146	GC-146	GC-128	150C15D
TYPE	CEILING	CEILING	CEILING	ROOF
CFM	100	100	50	2800
STATIC PRESSURE, IN WC	0.25	0.25	0.25	0.5
FAN RPM	844	844	750	1550
SONES	1.2	1.2	N/A	19.3
HP	32 WATTS	32 WATTS	27.5 WATTS	3/4
VOLTAGE / PHASE	115/1/60	115/1/60	115/1/60	120/1
DRIVE	DIRECT	DIRECT	DIRECT	DIRECT
CONTROL	INTERLOCK WITH LIGHTS	INTERLOCK WITH LIGHTS	INTERLOCK WITH THERMOSTAT	GAS DETECTION SYSTEM
REMARKS	1,2,3,4,5,6,7	1,2,3,4,5,6,7	1,2,3,4,5,6,7	1,2,3,4,5,6,7

NOTES:
1. MOTOR WITH THERMAL OVERLOADS
2. GRAVITY BACKDRAFT DAMPER
3. CEILING MOUNTED MOTION DETECTION, FAN TO OPERATE 10 MIN AFTER LAST MOTION SIGNAL
4. WALL DISCHARGE CAP
5. DISCONNECT
6. UL LISTED
7. VIBRATION ISOLATION KIT

LOUVER SCHEDULE

TAG	L-1		
MAKE	RUSKIN		
MODEL	ELF6375DX		
DEPTH	5"		
MATERIAL	ALUMINUM		
SERVICE	FRESH AIR		
CFM	2800		
LOUVER SIZE (IN)	30x30		
NET VELOCITY (FPM)	800		
STATIC PRESSURE, IN WC	0.2		
REMARKS	1,2,3,4,5,6		

NOTES:
1. LOUVERS TO BE AMCA CERTIFIED DATA.
2. 19 GAUGE GALVANIZED 0.5" SQUARE MESH BIRD SCREEN ON INTERIOR FAC.
3. COLOR TO MATCH BUILDING AS SELECTED BY ARCHITECT.
4. PROVIDE FLASHING AND CAULK WATERTIGHT TO BUILDING.
5. PITCH AND SEAL DUCTWORK TO DRAIN ALL WATER OUT THROUGH THE LOUVER.
6. PROVIDE FULL SIZE BACKDRAFT DAMPER WITH NYLON BEARINGS.

GAS DETECTION SYSTEM SCHEDULE

TAG	GD-1	
MAKE	AGS	
MODEL	PARKSAFE GDP2X	
GAS DETECTION	CO/NO2	
WARRANTY	2 YEARS	
REMOTE SENSORS	YES	
MODEL	AGSCOPS & AGSNO2PS	
NUMBER	2 OF EACH (GD-1.1& GD-1.2)	
CONTROLLER MOUNTING HEIGHT	48" AFF	
SENSOR MOUNTING HEIGHT	60" AFF	
CO ACTIVATION SETPOINT	25 PPM	
NO2 ACTIVATION SETPOINT	3 PPM	
VOLTAGE	120/1/60	
REMARKS	1	

NOTES:
1. SENSORS SHALL BE TIED TO EXHAUST FAN AND LOUVER MOTORIZED DAMPER. PROVIDE VENTILATION CONTROL SYSTEM WITH POWER ON LED, HIGH VOC ALARM, CONDITION LED FOR EACH SENSOR, FAN ON LED (ONE FOR EACH OUTPUT), LOCAL ALARM HORN AND LIGHT WITH SILENCE SWITCH, SENSOR POWER INDICATION, KEYED PANEL LOCK, MANUAL FAN OPERATION OVERRIDE SWITCH, AND ANY MISC. RELAYS, ETC. FOR A COMPLETE AND OPERABLE INSTALLATION. MECHANICAL CONTRACTOR IS SHALL PROVIDE ALL CONDUIT AND WIRING (120V, LOW VOLTAGE, ETC) TERMINATING ALL CONDUIT AND WIRING IN ITS ENTIRETY. IF M.C. DOESN'T HAVE A STAFFED ELECTRICIAN, THEY SHALL HIRE ONE TO COMPLETE THE WORK.

BOILER ROOM MONITOR SYSTEM SCHEDULE

TAG	BRM-1	
MAKE	AGS	
MODEL	MINI MERLIN CH4C0 50	
GAS DETECTION	CO2/NG	
WARRANTY	5 YEARS	
MOUNTING HEIGHT	48" AFF	
VOLTAGE	120/1/60	
ALARM LEVELS		
CO2 - LVL 1 / 2 (PPM)	25 / 50	
NG - LVL 1 / 2 (% LEL)	8 / 10	
DETECTION RANGE	800 SQ. FT.	
REMARKS	1,5	

NOTES:
1. CONTROL PANEL TO HAVE BOTH VISUAL AND AUDIBLE ALARM
2. CONTROL PANEL TO BE TIED TO BOILER ROOM EMERGENCY SHUTDOWN
3. CONTROL PANEL TO FIRE ALARM
4. CONTROL PANEL TO PROVIDE POINTS AND ALARM TO BMS
5. FURNISH SYSTEM WITH AGS-GSV2 120V SOLENOID GAS SHUTOFF VALVE.

DIFFUSER SCHEDULE

TAG	S-1	S-2	R-1	E-1		
MAKE	PRICE	PRICE	PRICE	PRICE		
SIZE	12x12	24x24	24x24	24x30		
NECK SIZE	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS		
MODEL	SPD	SPD	530	530		
FACE	PLAQUE	PLAQUE	LOUVERED	LOUVERED		
MOUNTING	SURFACE	T-BAR	T-BAR	SIDEWALL		
NC	<20	<20	<20	<20		
COLOR	BY ARCH	BY ARCH	BY ARCH	BY ARCH		
OBD	YES, OBD	YES, OBD	YES, OBD	YES, OBD		
REMARKS	1,2,3	1,2,3	1,2,3	1,2,3		

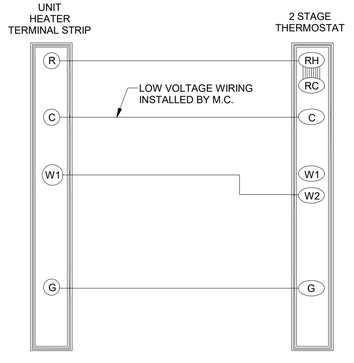
NOTES
1. VERIFY FRAME TYPE AND LOCATION WITH ARCHITECT.
2. SUBMITTAL TO INCLUDE ROOM SCHEDULE INDICATING DETAILS FOR UNITS IN EACH ROOM.
3. PRESSURE DROP NOT TO EXCEED 0.10" W.C., NC RATING NOT TO EXCEED 30 dB WITH ROOM dB OF 10.

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UNIT HEATER SEQUENCE OF OPERATION:

UNIT HEATER SHALL BE PROVIDED LOW VOLTAGE THERMOSTAT.

UNIT SHALL CYCLE ON AS REQUIRED TO MAINTAIN HEATING SETPOINT OF 60°F (ADJUSTABLE.)



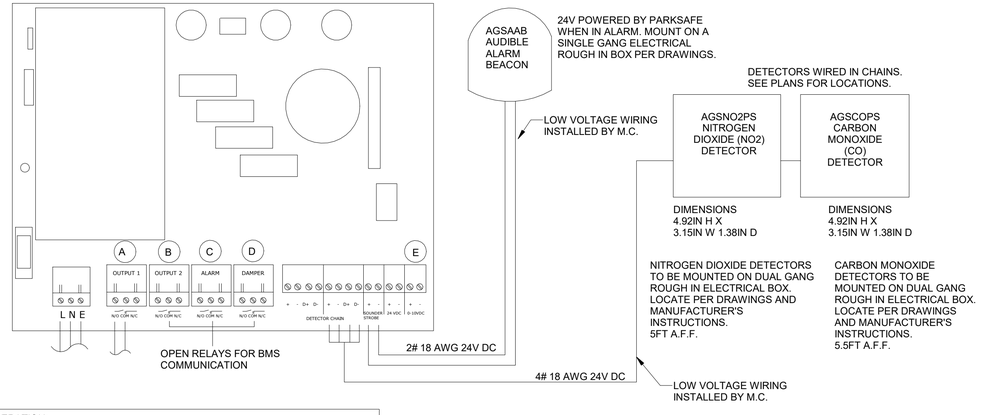
1 M6.00 UNIT HEATER CONTROL SYSTEM SCHEMATIC
NO SCALE

EXHUAST FAN SEQUENCE OF OPERATION:

EF-1 & EF-2
FANS SHALL BE INTERLOCKED WITH LIGHTING.

EF-3
FAN SHALL BE PROVIDED WITH A REVERSE ACTING TERMOSTAT AND SHALL ENERGIZE WHEN THE ROOM TEMPERATURE RISES ABOVE 80°F (ADJ.)

REFERENCE ELECTRICAL DRAWINGS FOR ALL LINE VOLTAGE WIRING, RELAYS, ETC. FOR SYSTEM OPERATION.



VENTILATION CONTROL SYSTEM SEQUENCE OF OPERATION:

UPON A HIGH CONCENTRATION OF EITHER CO OR N02 FROM THE REMOTE SENSORS, A SIGNALL SHALL BE SENT FROM THE CONTROL PANEL TO ENERGIZE THE MAKEUP AIR UNIT. FROM THE MAKEUP AIR UNIT, A SIGNAL SHALL BE SENT TO THE RESPECTIVE EXHAUST FAN TO ENERGIZE IN CONJUNCTION WITH THE MAKEUP AIR UNIT.

A LINE VOLTAGE MANUAL OVERRIDE SWITCH SHALL BE PROVIDED IN THE EVENT THE USER WOULD LIKE TO TURN THE VENTILATION SYSTEM ON MANUALLY.

2 M6.00 VENTILATION CONTROL SYSTEM SCHEMATIC
NO SCALE

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ARCHITECTS ▪ ENGINEERS ▪ SCIENTISTS ▪ SURVEYORS

DRAWN BY: MJ
CHECKED BY: JL

APPROVAL DRAWINGS
JANUARY 9, 2026

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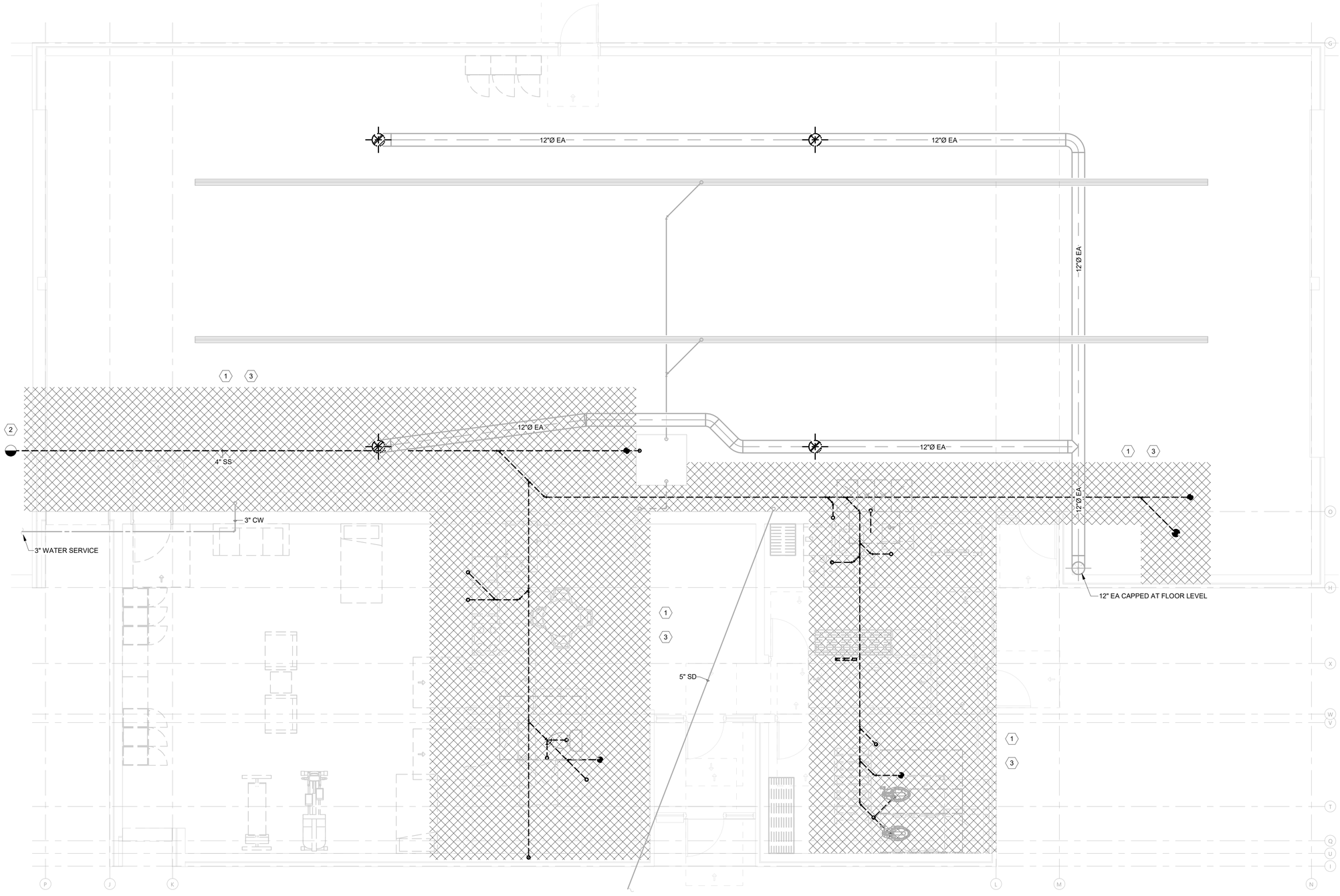
CONTROLS

M6.00

PROJECT #: 2025-10872

PLUMBING DEMOLITION KEY NOTES:

1. HATCHED AREA INDICATES AREA OF FLOOR WHICH WILL REQUIRE SAWCUT FOR DEMOLITION AND NEW PLUMBING INSTALLATION.
2. PONIT OF CONNECTION. CONNECT NEW 4" SANITARY SEWER TO EXISTING MAIN AT APPROXIMATELY THIS LOCATION. FIELD VERIFY EXACT CONNECTION POINT.
3. DEMOLISH EXISTING SANITARY PIPING, FITTINGS, ETC. FOR A COMPLETE SYSTEM REMOVAL. PREPARE TRENCH FOR INSTALLATION OF NEW BUILDING SEWER SYSTEM. SEE REMODEL PLANS.



1 MD1.00 PLUMBING - UNDERFLOOR DEMO
1/4" = 1'-0"

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2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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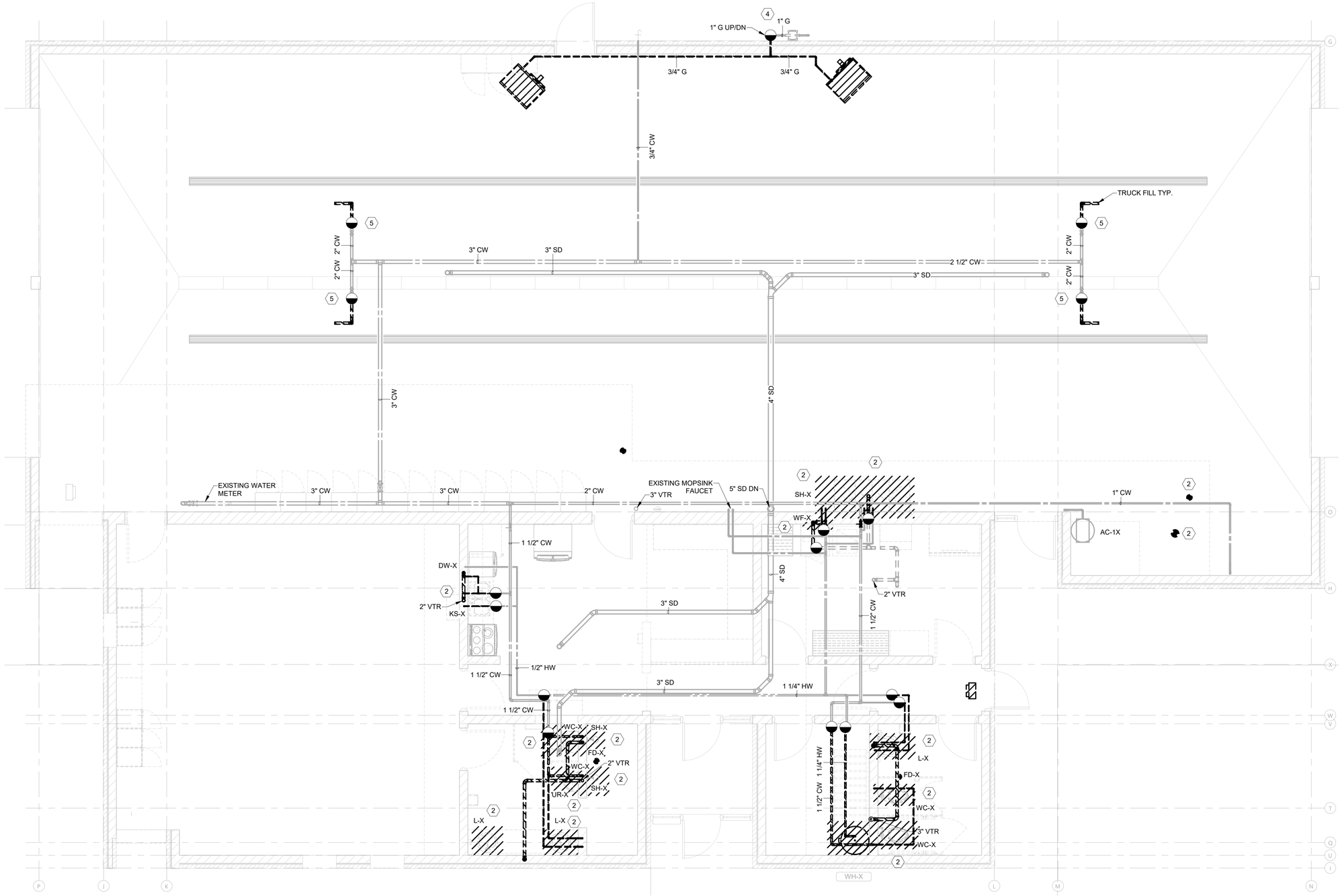
PLUMBING PLAN - UNDERFLOOR DEMOLITION

MD1.00

PROJECT #: 2025-10872

PLUMBING DEMOLITION KEY NOTES:

1. REMOVE EXISTING WATER AND VENT PIPING, HANGERS, INSULATION, ETC. IN THIS AREA AND PREPARE PIPING FOR CONNECTION TO NEW. SEE REMODEL PLAN FOR FURTHER INFORMATION.
2. REMOVE EXISTING PLUMBING FIXTURE IN ITS ENTIRETY.
3. REMOVE EXISTING FLOOR DRAIN/CLEANOUT AND PROVIDE NEW WITH THE NEW SYSTEM.
4. POINT OF DISCONNECTION. DISCONNECT GAS PIPNIG AT APPROXIMATELY THIS LOCATION AND PREPARE PIPING FOR NEW CONNECTION. SEE REMODEL PLAN FOR FURTHER INFORMATION.
5. POINT OF DISCONNECTION. DISCONNECT TRUCK FILL WATER LINES AT APPROXIMATELY THIS LOCATION AND PREPARE PIPING FOR NEW CONNECTION. SEE REMODEL PLAN FOR FURTHER INFORMATION.



1 MD1.01 PLUMBING - FIRST FLOOR DEMO
1/4" = 1'-0"

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CHECKED BY: JL

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

PLUMBING PLAN - FIRST FLOOR DEMOLITION

MD1.01

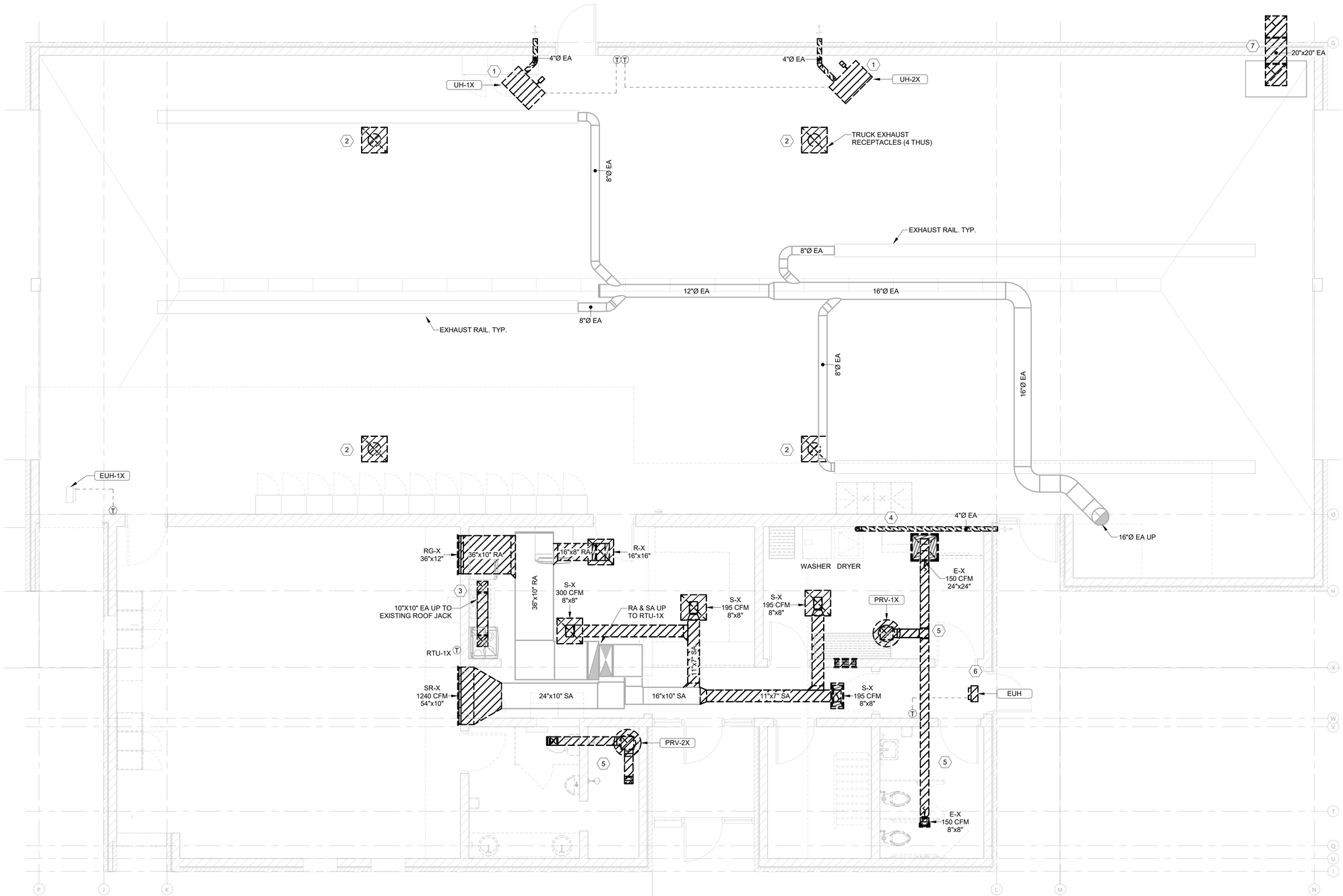
PROJECT #: 2025-10872

2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

MECHANICAL DEMOLITION KEY NOTES:

1. REMOVE EXISTING UNIT HEATER, HANGERS, CONTROLS, VENTING, ETC. FOR A COMPLETE SYSTEM REMOVAL. DISCONNECT GAS PIPING AND PREPARE FOR CONNECTION TO NEW HEATER. SEE REMODEL PLAN FOR FURTHER INFORMATION.
2. SLUG EXISTING TRUCK EXHAUST RECEPTABLE WITH CONCRETE AND ABANDON EXISTING EXHAUST PIPING UNDERFLOOR.
3. REMOVE EXISTING KITCHEN RANGE HOOD, DUCTWORK, EXHAUST FAN, AND CONTROLS FOR A COMPLETE SYSTEM REMOVAL. SEE REMODEL PLAN FOR FURTHER INFORMATION.
4. REMOVE EXISTING DRYER EXHAUST DUCTWORK IN ITS ENTIRETY.
5. REMOVE EXISTING EXHAUST FAN, DUCTWORK, HANGERS, INSULATION, CONTROLS, ETC. FOR COMPLETE SYSTEM REMOVAL. SEE REMODEL PLAN FOR FURTHER INFORMATION.
6. REMOVE EXISTING ELECTRIC UNIT HEATER, HANGERS, CONTROLS, ETC. FOR A COMPLETE SYSTEM REMOVAL.
7. REMOVE EXISTING EXHAUST DUCT SERVING HOSE WASHER AND PATCH WALL TO MATCH EXISTING.



1 MD3.00 HVAC PLAN - FIRST FLOOR DEMO
1/4" = 1'-0"

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EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

HVAC PLAN - FIRST FLOOR DEMOLITION

MD3.00

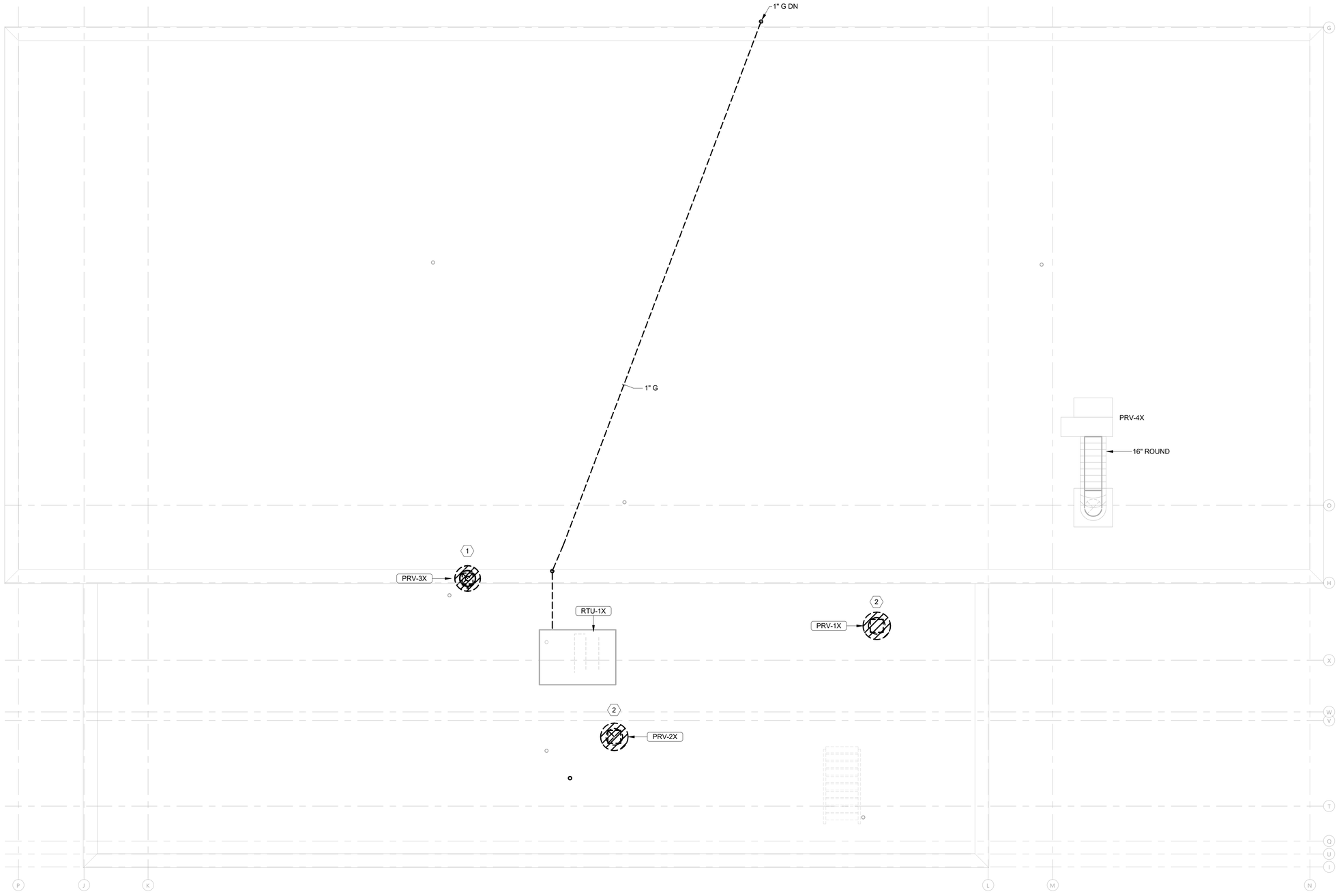
PROJECT #: 2025-10872

2025-10872 EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

MECHANICAL DEMOLITION KEY NOTES:

1. REMOVE EXISTING KITCHEN RANGE HOOD, DUCTWORK, EXHAUST FAN, AND CONTROLS FOR A COMPLETE SYSTEM REMOVAL. CAP CURB AND PROVIDE CAP WITH (2) LAYERS OF 2" RIGID INSULATION. SEE REMODEL PLAN FOR FURTHER INFORMATION.

2. REMOVE EXISTING EXHAUST FAN, DUCTWORK, HANGERS, INSULATION, CONTROLS, ETC. FOR COMPLETE SYSTEM REMOVAL. CAP CURB AND PROVIDE CAP WITH (2) LAYERS OF 2" RIGID INSULATION. SEE REMODEL PLAN FOR FURTHER INFORMATION.



1 MD3.01 HVAC PLAN - ROOF DEMO
1/4" = 1'-0"

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EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

HVAC PLAN - ROOF DEMOLITION

MD3.01

PROJECT #: 2025-10872

2025-10872

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

GENERAL NOTES

1. THE WORK INDICATED ON THESE DRAWINGS CONSISTS OF PROVIDING ALL LABOR, SUPERVISION, EQUIPMENT, AND MATERIALS NECESSARY FOR AND INCIDENTAL TO THE INSTALLATION OF THE COMPLETE ELECTRICAL SYSTEMS REQUIRED BY THESE DRAWINGS.
2. THE ENTIRE INSTALLATION OF THE ELECTRICAL SYSTEMS SHALL BE MADE IN ACCORDANCE WITH ALL ORDINANCES, LAWS, REGULATIONS, AND CODES APPLICABLE TO THE WORK INVOLVED. IF, IN ANY INSTANCE, THE PLANS CONFLICT WITH SUCH CODES, THE CODE SHALL TAKE PREFERENCE. THIS DOES NOT RELIEVE THE CONTRACTOR FROM COMPLYING WITH ANY REQUIREMENTS OF THE DRAWINGS THAT MAY BE IN EXCESS OF CODES AND NOT CONTRARY TO THE SAME.
3. REFER TO ARCHITECTURAL DRAWINGS FOR TYPES AND FIRE RATINGS OF WALLS. SEAL PENETRATIONS WITH APPROVED SEALANT AND COMPLIANCE WITH BUILDING CODES.
4. COORDINATE MECHANICAL EQUIPMENT HOOK-UP AND REQUIREMENTS WITH MECHANICAL DRAWINGS. REFER TO MECHANICAL DRAWINGS FOR EXACT EQUIPMENT LOCATIONS AND RATINGS OF MOTORS, ETC.
5. REFER TO MECHANICAL DRAWINGS FOR FIRE/SMOKE DAMPER LOCATIONS. PROVIDE POWER TO FIRE/SMOKE DAMPERS AS REQUIRED AND FIRE ALARM INTERFACE AND MONITORING.
6. COORDINATE ALL CEILING MOUNTED ELECTRICAL EQUIPMENT WITH THE ARCHITECTURAL CEILING PLANS. THIS INCLUDES, BUT IS NOT LIMITED TO, LIGHT FIXTURES, SMOKE DETECTORS, FIRE ALARM DEVICES, ETC.
7. COORDINATE LIGHT FIXTURE LOCATIONS IN MECHANICAL EQUIPMENT ROOMS WITH EQUIPMENT. FIXTURES SHALL BE LOCATED WHERE NOT BLOCKED BY DUCTWORK AND PIPING AND WILL PROVIDE LIGHT FOR MAINTAINING EQUIPMENT.
8. COORDINATE RECEPTACLE REQUIREMENTS WITH EQUIPMENT PROVIDED BY OTHER TRADES. PROVIDE AND LOCATE RECEPTACLES AS REQUIRED FOR EQUIPMENT FURNISHED BY OTHERS.
9. RECEPTACLES SHALL NOT BE LOCATED BACK TO BACK IN SAME WALL. PROVIDE A MINIMUM OF 24" SPACE BETWEEN BACK TO BACK RECEPTACLES. WHERE LOCATION IS CRITICAL AND BACK TO BACK RECEPTACLES ARE UNAVOIDABLE, PROVIDE AN ACOUSTICAL SOUND INSULATION BATT BETWEEN BOXES.
10. PROVIDE FLEXIBLE CONNECTORS FOR ELECTRICAL CONDUITS THAT CROSS BUILDING SEISMIC SEPARATIONS OR EXPANSION JOINTS. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF EXPANSION JOINTS.
11. PROVIDE A SEPARATE NEUTRAL FOR EACH SINGLE PHASE BRANCH CIRCUIT.
12. PROVIDE GFCI PROTECTION FOR RECEPTACLES AS REQUIRED BY CODE FOR FOOD SERVICE AREAS, OUTDOORS, LOCKER ROOMS, AND WITHIN 6-FT OF A SINK. WHERE RECEPTACLES ARE CONSIDERED NOT READILY ACCESSIBLE, GFCI PROTECTION SHALL BE AT THE CIRCUIT BREAKER. COORDINATE WITH FURNITURE AND EQUIPMENT.
13. ANY AND ALL SHUT DOWNS TO BE COORDINATED WITH OWNER PRIOR TO DISRUPTION OF SERVICE. A MINIMUM 48 HOURS NOTICE IS REQUIRED PRIOR TO EXECUTION OF WORK THAT REQUIRES ANY DISRUPTION OF UTILITIES. SHUT DOWNS THAT WILL RESULT IN EXTENDED SERVICE DISRUPTION REQUIRE ADDITIONAL NOTICE AND COORDINATION WITH OWNER.

DISCONNECT LEGEND

D 2 3 R F

- F FOR FUSIBLE (NO F INDICATES NON-FUSIBLE)
- R FOR NEMA 3R (NO R INDICATES NEMA 1)
- AMPERE RATING
  - 3: 30-AMP
  - 6: 60-AMP
  - 1: 100-AMP
  - 2: 200-AMP
- VOLTAGE
  - 2: 240V
  - 6: 600V
- DISCONNECT, HEAVY DUTY

VERIFY FUSE SIZES WITH EQUIPMENT NAMEPLATE.
DU: INDICATES DISCONNECT PROVIDED WITH EQUIPMENT BY OTHERS

ELECTRICAL SYMBOLS LEGEND

SYMBOL LEGEND IS ALL INCLUSIVE. NOT ALL THE SYMBOLS IN THE LEGEND ARE INCLUDED IN THIS PROJECT.

LIGHTING

- 2' X 2' RECESSED TROFFER
- 2' X 2' RECESSED TROFFER, EGRESS
- 2' X 4' RECESSED TROFFER
- 2' X 4' RECESSED TROFFER, EGRESS
- WALL MOUNT LIGHT FIXTURE
- RECESSED DOWNLIGHT
- RECESSED DOWNLIGHT, EGRESS
- RECESSED DOWNLIGHT, WALLWASHER
- SURFACE LIGHT FIXTURE, EGRESS
- SURFACE FIXTURE
- SURFACE FIXTURE, EGRESS
- SUSPENDED INDIRECT FIXTURE
- STRIP FIXTURE
- STRIP FIXTURE, EGRESS
- WALL MOUNT EXIT LIGHT
- CEILING MOUNT EXIT LIGHT
- WALL MOUNT EXIT LIGHT WITH EMERGENCY HEADS
- EMERGENCY BATTERY PACK
- REMOTE EMERGENCY FIXTURE
- POLE LIGHT
- BOLLARD LIGHT
- FLOOD LIGHT

LIGHTING CONTROL

- SWITCH
  - X REPRESENTS IDENTIFIERS AS FOLLOWS:
  - 3 3-WAY SWITCH
  - 4 4-WAY SWITCH
  - D DIMMER SWITCH
  - LV LOW VOLTAGE
  - OS OCCUPANCY SENSOR
  - OD 0-10V DIMMER/OCCUPANCY SENSOR
- PHOTOCELL
- TIME CLOCK
- LIGHTING CONTACTOR
- WALL MOUNT VACANCY/OCCUPANCY SENSOR
- CEILING MOUNT VACANCY/OCCUPANCY SENSOR
- DAYLIGHT SENSOR
- LIGHTING CONTROL SYSTEM POWER PACK
- LOW VOLTAGE CORNER MOUNT OCCUPANCY SENSOR
- NETWORK LIGHTING CONTROL SYSTEM LOW VOLTAGE SWITCH
- NETWORK LIGHTING CONTROL SYSTEM LOW VOLTAGE SWITCH
- REMOTE TEST SWITCH FOR EMERGENCY LIGHT
- LIGHTING CONTROL SCHEMATIC IDENTIFICATION

POWER

- JUNCTION BOX
- EQUIPMENT CONNECTION
- DUPLEX RECEPTACLE, NEMA 5-20R
  - X REPRESENTS IDENTIFIERS AS FOLLOWS:
  - NONE NONE
  - 44" MOUNTING HEIGHT OTHER THAN STANDARD
  - CLG CEILING MOUNTED OUTLET
  - GFI GFI OUTLET
  - WP WEATHERPROOF OUTLET
  - AC ABOVE COUNTER
- 4-PLEX RECEPTACLE, NEMA 5-20R
- GROUND FAULT CIRCUIT INTERRUPTER (GFCI) TYPE RECEPTACLE
- ISOLATED GROUND (IG) TYPE RECEPTACLE
- DUPLEX COMBINATION USB TYPE RECEPTACLE
- SINGLE RECEPTACLE, NEMA 5-20R
- SPECIAL APPLICATION RECEPTACLE
- FLOOR BOX WITH DEVICES AS INDICATED
- POWER POLE
- 20" WIDE PANELBOARD
- SWITCH
  - X REPRESENTS IDENTIFIERS AS FOLLOWS:
  - M MANUAL MOTOR SWITCH
- D23 DISCONNECT SWITCH, SEE LEGEND
- COMBINATION STARTER/DISCONNECT
- MOTOR CONTROLLER
- VFD VARIABLE FREQUENCY DRIVE
- MOTOR
  - # SEE MOTOR SCHEDULE
  - EF EXHAUST FAN
  - OH OVERHEAD DOOR MOTOR
  - AD AUTOMATIC DOOR OPENER
  - MD MOTORIZED DAMPER
  - FS FIRE/SMOKE DAMPER
- METER
- TRANSFORMER
- THERMOSTAT
- PUSHBUTTON, ADA DOOR OPERATOR
- PUSHBUTTON CONTROL STATION
- MUSHROOM TYPE PUSHBUTTON OR OTHER AS SPECIFIED
- UNDERGROUND ELECTRICAL CONDUIT

COMMUNICATION

- TELEPHONE OUTLET
  - W WALL MOUNT TELEPHONE
- TELEPHONE/DATA OUTLET
- DATA OUTLET
- TELEVISION OUTLET
- CEILING SPEAKER
- VOLUME CONTROL
- MICROPHONE OUTLET
- AUXILIARY OUTLET
- WIRELESS ACCESS POINT

ANNOTATION

- L1(1,3,5) HOMERUN - TEXT DESIGNATES PANEL AND CIRCUIT NUMBERS. REFER TO PANEL SCHEDULE FOR BREAKER ARRANGEMENT. CONDUCTORS SHALL BE #12 AWG IN A 3/4" CONDUIT UNLESS NOTED OTHERWISE. LONG HASH MARKS INDICATE NEUTRAL CONDUCTORS, SHORT HASH MARKS INDICATE NUMBER OF PHASE CONDUCTORS. NO HASH MARKS INDICATE 3#12 IN A 3/4" C. PROVIDE A CODE-SIZED GROUND IN EACH CONDUIT.
- A UPPER CASE LETTER INDICATES FIXTURE TYPE SEE LIGHT FIXTURE SCHEDULE
- 1:01 INDICATES CONTROL RELAY OR SWITCH
  - NUMBER INDICATES CIRCUIT NUMBER
- # SHEET NOTE
- XX SHEET NOTE - DEMOLITION
- REVISION INDICATOR
- TITLE / SCALE DETAIL VIEWPORT TITLE
- SECTION CUT

FIRE ALARM

- FACP FIRE ALARM CONTROL PANEL
- FAAP FIRE ALARM ANNUNCIATOR PANEL
- F FIRE ALARM MANUAL PULL STATION
- FIRE ALARM SMOKE DETECTOR
  - CO COMBINATION SMOKE/CO DETECTOR
- FIRE ALARM HEAT DETECTOR
- DD FIRE ALARM DUCT DETECTOR
- FR FIRE ALARM RELAY
- M FIRE ALARM MAGNETIC DOOR HOLDER
- FIRE ALARM AUDIO DEVICE
- FIRE ALARM VISUAL DEVICE
- FIRE ALARM AUDIO/VISUAL DEVICE - SPEAKER STROBE
- SIDE-BY-SIDE FIRE ALARM AUDIO/VISUAL DEVICE - SPEAKER STROBE AND MASS NOTIFICATION AMBER STROBE DEVICE
- B FIRE ALARM BELL
- IAM FIRE ALARM INDIVIDUAL ADDRESSABLE MODULE
- ZAM FIRE ALARM ZONE ADDRESSABLE MODULE
- TS SPRINKLER SYSTEM TAMPER SWITCH
- FS SPRINKLER SYSTEM FLOW SWITCH

SECURITY

- CR CARD READER
- DOOR POSITION SWITCH
- ELECTRIC STRIKE
- REX REQUEST TO EXIT
- CCTV CAMERA
  - PTZ PAN-TILT ZOOM
  - FC FIXED

ELECTRICAL DRAWING INDEX

E0.01	ELECTRICAL SYMBOLS, SPECIFICATIONS AND SHEET INDEX
E0.02	ELECTRICAL DETAILS
ED1.01	FIRST LEVEL FLOOR PLAN - ELECTRICAL DEMOLITION
ED1.02	ROOF PLAN - ELECTRICAL DEMOLITION
E1.01	SITE PLAN - ELECTRICAL
E2.01	FIRST LEVEL FLOOR PLAN - LIGHTING
E3.01	FIRST LEVEL FLOOR PLAN - POWER
E3.02	ROOF PLAN - POWER
E4.01	FIRST LEVEL FLOOR PLAN - SYSTEMS
E6.01	ONE-LINE DIAGRAM
E6.11	PANEL SCHEDULES
E7.01	LIGHT FIXTURE SCHEDULE
E8.01	DETAILS

ABBREVIATIONS

A	AMPERES
AC	ABOVE COUNTER
AFC	AVAILABLE FAULT CURRENT
AFF	ABOVE FINISHED FLOOR
AIC	AMPERE INTERRUPTING CURRENT
AL	ALUMINUM
ATS	AUTOMATIC TRANSFER SWITCH
AHJ	AUTHORITY HAVING JURISDICTION
C	CONDUIT
CB	CIRCUIT BREAKER
CBIC	CIRCUIT BREAKER INTERRUPTING CURRENT
CD	CANDELA
CU	COPPER
EC	ELECTRICAL CONTRACTOR
E	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ENT	ELECTRICAL NON-METALLIC TUBING
EX	EXISTING
F	FUSE
G	GROUND
GC	GENERAL CONTRACTOR
GFI OR GFCI	GROUND FAULT CIRCUIT INTERRUPTER
HD	HEAVY DUTY
H	HOT
HPS	HIGH PRESSURE SODIUM
HT	HEIGHT
IMC	INTERMEDIATE METAL CONDUIT
INC	INCANDESCENT LTS LIGHTS
KW	KILOWATT
KVA	KILOVOLT-AMPERE
MC	MECHANICAL CONTRACTOR
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUG ONLY
MSB	MAIN SWITCHBOARD
MFR	MANUFACTURER
MH	METAL HALIDE
MCC	MOTOR CONTROL CENTER
MTG	MOUNTING
N	NEUTRAL
N1	NEMA 1
N3R	NEMA 3R
NF	NON-FUSED
NL	NIGHT LIGHT
PH, Ø	PHASE
P	POLE
RMC	RIGID METAL CONDUIT
SES	SERVICE ENTRANCE SECTION
TMB	TELEPHONE MOUNTING BOARD
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
V	VOLT
VA	VOLT-AMPS
W	WIRE
WP	WEATHERPROOF
XFMR	TRANSFORMER

2023-34

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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DRAWN BY: KS / JB
CHECKED BY: JAB

APPROVAL DRAWINGS
JANUARY 9, 2026

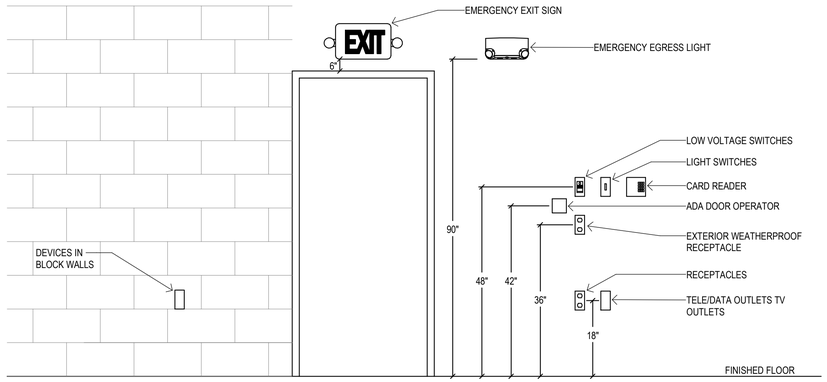
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EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

ELECTRICAL SYMBOLS, SPECIFICATIONS AND SHEET INDEX

E0.01

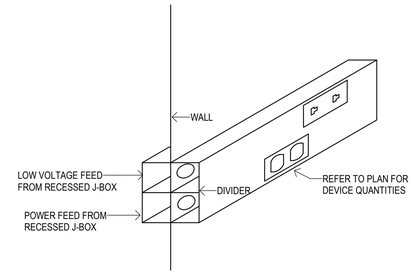
PROJECT #: 2023-34



NOTE: THESE MOUNTING HEIGHTS ARE TYPICAL UNLESS NOTED OTHERWISE ON THE DRAWINGS.

2 TYPICAL DEVICE MOUNTING HEIGHT DETAIL

N.T.S.



NOTES:
1. SURFACE RACEWAY SHALL BE WIREMOLD 4000 SERIES, 2-CHANNEL, ALUMINUM FINISH.
PROVIDE A COMPLETE SYSTEM WITH ALL CONNECTORS CORNERS, COVERS, FACEPLATES, ETC. PROVIDE A DIVIDER TO SEPARATE COMMUNICATIONS AND POWER.
2. SURFACE RACEWAY SHALL BE ALUMINUM.
3. INSTALL PER MANUFACTURER'S REQUIREMENTS

5 SURFACE RACEWAY - 2 CHANNEL

1/8" = 1'-0"

IDENTIFICATION GUIDELINES

ELECTRICAL EQUIPMENT

SAMPLE PLACARD, PROVIDE PLACARD FOR EACH PANEL TO INDICATE IDENTIFICATION, VOLTAGE, AMPS, FED FROM, AND FEEDER

PANEL R-1A
120/208V, 3-PH, 4W
200 AMPS
FED FROM T-R1
4#3/0, 1#6G

ELECTRICAL JUNCTION BOX
[CIRCUITS/USE]

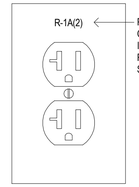
PROVIDE LABEL FOR ELECTRICAL BOXES 12"X12" AND LARGER
INDICATE CIRCUIT OR USE AS APPLICABLE

ELECTRICAL DISCONNECT FOR
[EQUIPMENT NAME]
FED FROM [CIRCUIT]

PROVIDE LABEL FOR DISCONNECT SWITCHES
LABEL SHALL INCLUDE THE EQUIPMENT NAME

EXAMPLE OF PANEL DIRECTORY:
DESCRIPTION INFORMATION SHALL INCLUDE ROOM NUMBER, LOCATION, ETC.

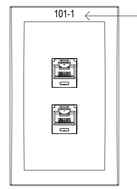
DESCRIPTION	CKT NO.
RECEPTACLES ROOM 101	1
RECEPTACLES ROOM 101, WEST WALL	3
	5
LIGHTS IN ROOM 200	7
SPARE	9
	11



CONDUIT COLOR CODING

USE	COLOR
FIRE ALARM	RED (FACTORY FINISH)
CONTROL WIRING	BLUE (DIFFERENT THAN COMPRESSED AIR PIPING)
ALL OTHER EXPOSED	PAINTED BY GC AFTER INSTALLATION

COMMUNICATIONS



2023-34

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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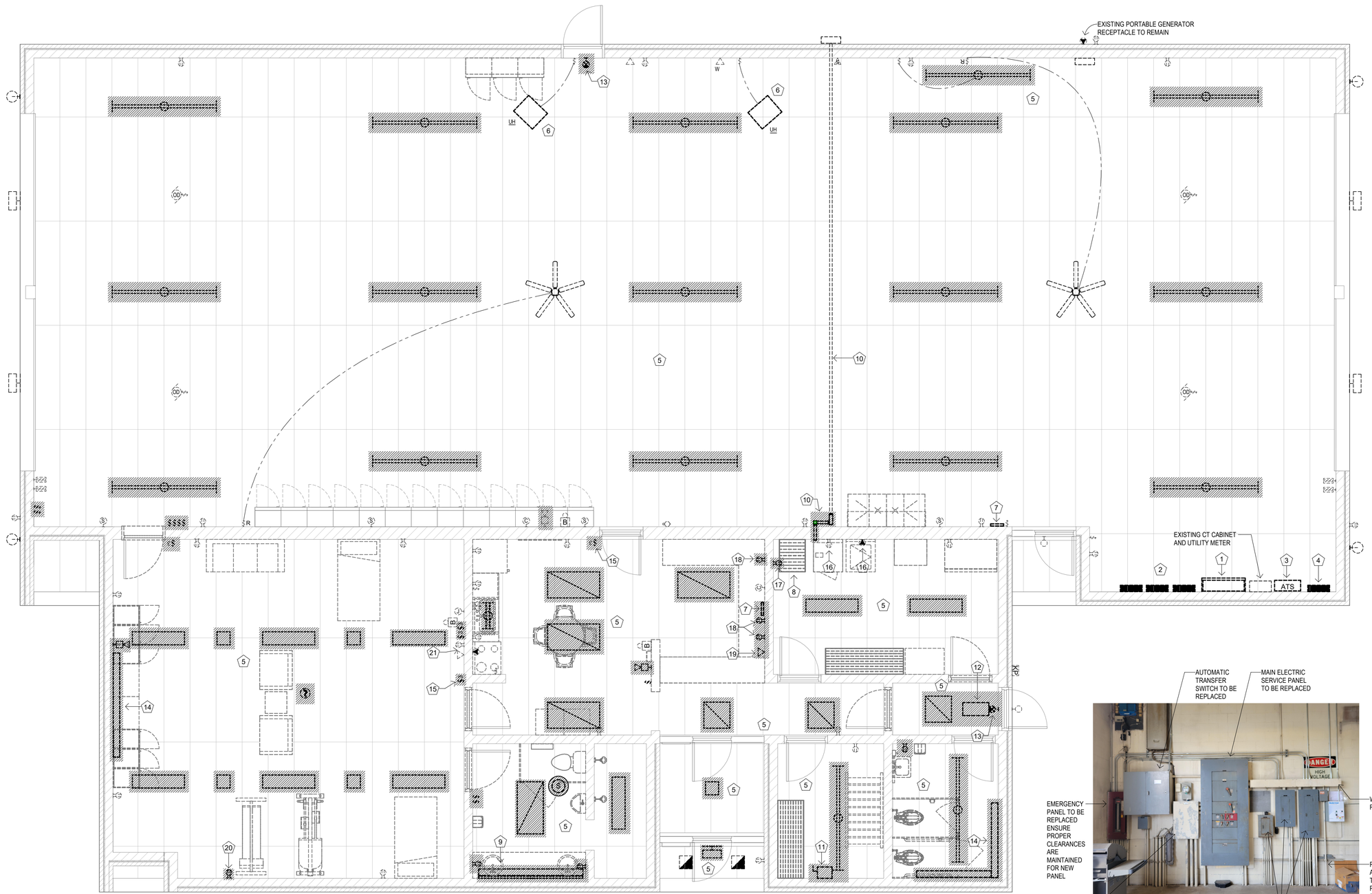
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EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

ELECTRICAL DETAILS

E0.02

PROJECT #: 2023-34



1 FIRST LEVEL FLOOR PLAN - ELECTRICAL DEMOLITION
1/4" = 1'-0"

GRAPHIC SCALE
0' 12' 24'

N

2 EXISTING ELECTRICAL PANELS
N.T.S.

GENERAL NOTES

A. CONTRACTOR SHALL COORDINATE EXISTING CONDITIONS WITH NEW WORK. EXISTING CONDUIT AND WIRING SHOULD BE REUSED WHERE POSSIBLE.

B. EXISTING CONDITIONS SHOWN ARE BASED ON AS BUILT DRAWINGS AND LIMITED FIELD OBSERVATION. CONTRACTOR SHALL VERIFY INFORMATION SHOWN. DASHED ITEMS ON THIS PLAN ARE EXISTING. HATCHED ITEMS ARE TO BE REMOVED. ITEMS NOT HATCHED ARE TO REMAIN IN SERVICE UNLESS NOTED OTHERWISE. ENSURE DEVICES ARE OPERATIONAL WHEN CONSTRUCTION IS COMPLETE. FIELD VERIFY ALL EXISTING CONDITIONS.

C. CONTRACTOR SHALL PROPERLY DISPOSE OF ALL MATERIAL OF NO VALUE TO OWNER. DISPOSE IN ACCORDANCE WITH LOCAL AND EPA REGULATIONS.

D. CONTRACTOR SHALL BE RESPONSIBLE FOR STORING AND PROTECTING ITEMS SCHEDULED TO BE REINSTALLED. DAMAGED ITEMS SHALL BE REPLACED AT CONTRACTOR'S EXPENSE.

E. REVIEW ARCHITECTURAL DRAWINGS FOR INFORMATION REGARDING ASBESTOS ABATEMENT.

F. MAINTAIN WIRING TO EXISTING FIRE ALARM DEVICES TO REMAIN ENSURE PROPER OPERATION WHEN INSTALLATION IS COMPLETE.

DEMO NOTES

1. REMOVE EXISTING MAIN SERVICE PANEL TO BE REPLACED. DISCONNECT SERVICE AND BRANCH FEEDERS AND MAINTAIN FOR RECONNECTION TO NEW SERVICE PANEL.
2. REMOVE EXISTING BRANCH CIRCUIT PANELS TO BE REPLACED. DISCONNECT BRANCH CIRCUITS AND MAINTAIN FOR RECONNECTION TO NEW PANELS.
3. REMOVE EXISTING AUTOMATIC TRANSFER SWITCH TO BE REPLACED. DISCONNECT FEEDERS AND MAINTAIN FOR RECONNECTION TO NEW ATS.
4. REMOVE EXISTING EMERGENCY PANEL TO BE REPLACED. DISCONNECT FEEDERS AND BRANCH CIRCUITS AND MAINTAIN FOR RECONNECTION TO NEW EMERGENCY PANEL.
5. REMOVE EXISTING LIGHT FIXTURES AND CONDUCTORS. MAINTAIN CONDUIT FOR NEW CONDUCTORS AND CIRCUITRY FOR NEW LIGHTING.
6. DISCONNECT POWER TO GAS UNIT HEATER.
7. REMOVE CONTROL SWITCH PANEL.
8. EXISTING IT RACK. RELOCATE TO NEW IT ROOM LOCATION. ALL CABLING TO BE REROUTED/EXTENDED TO NEW LOCATION.
9. REMOVE COVE HEATER AND LIGHT ABOVE MIRROR.
10. EXISTING 2" C. OVERHEAD FOR INCOMING FIBER TO IT RACK. CONDUIT ROUTING TO BE MODIFIED AS SHOWN TO ROUTE TO NEW IT ROOM. FIBER TO BE REMOVED AND REINSTALLED.
11. DISCONNECT POWER TO WATER HEATER. REMOVE DISCONNECT AND CONDUCTORS BACK TO SOURCE. CONDUIT MAY BE REUSED FOR NEW CIRCUITRY TO NEW MECHANICAL EQUIPMENT.
12. DISCONNECT POWER TO ELECTRIC HEATER IN CEILING AND REMOVE.
13. REMOVE EXIT LIGHT. MAINTAIN BOX AND CIRCUIT FOR NEW EXIT LIGHT. SEE LIGHTING PLAN.
14. REMOVE ELECTRIC COVE HEATER.
15. REMOVE EXISTING LIGHT SWITCH AND WIRING. MAINTAIN BOX AND CONDUIT FOR NEW LOW VOLTAGE LIGHTING CONTROL DEVICE AND CABLING.
16. RELOCATE OUTLET TO NEW FURRED OUT WALL AND EXTEND WIRING AS REQUIRED. SEE POWER PLAN.
17. REMOVE SURFACE RECEPTACLE AND SURFACE CONDUIT BACK TO SOURCE.
18. REMOVE RECEPTACLE. REUSE BOX AND CONDUIT TO FEED CIRCUITS TO NEW SURFACE RACEWAY. SEE POWER PLAN.
19. REMOVE DATA OUTLET. REUSE BOX AND CONDUIT FOR NEW DATA CABLING TO NEW SURFACE RACEWAY. SEE POWER PLAN.
20. VERIFY THAT THIS IS THE LAST DEVICE IN THE CIRCUIT. REMOVE CONDUCTORS BACK TO PREVIOUS DEVICE. ABANDON BOX IN PLACE.
21. REMOVE EXPOSED FREE-AIR TELEPHONE CABLES ENTIRELY.

2023-34

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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JANUARY 9, 2026

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561

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

FIRST LEVEL FLOOR PLAN - ELECTRICAL DEMOLITION

ED1.01

PROJECT #: 2023-34

GENERAL NOTES

A. CONTRACTOR SHALL COORDINATE EXISTING CONDITIONS WITH NEW WORK. EXISTING CONDUIT AND WIRING SHOULD BE REUSED WHERE POSSIBLE.

B. EXISTING CONDITIONS SHOWN ARE BASED ON AS BUILT DRAWINGS AND LIMITED FIELD OBSERVATION. CONTRACTOR SHALL VERIFY INFORMATION SHOWN. DASHED ITEMS ON THIS PLAN ARE EXISTING. HATCHED ITEMS ARE TO BE REMOVED. ITEMS NOT HATCHED ARE TO REMAIN IN SERVICE UNLESS NOTED OTHERWISE. ENSURE DEVICES ARE OPERATIONAL WHEN CONSTRUCTION IS COMPLETE. FIELD VERIFY ALL EXISTING CONDITIONS.

C. CONTRACTOR SHALL PROPERLY DISPOSE OF ALL MATERIAL OF NO VALUE TO OWNER. DISPOSE IN ACCORDANCE WITH LOCAL AND EPA REGULATIONS.

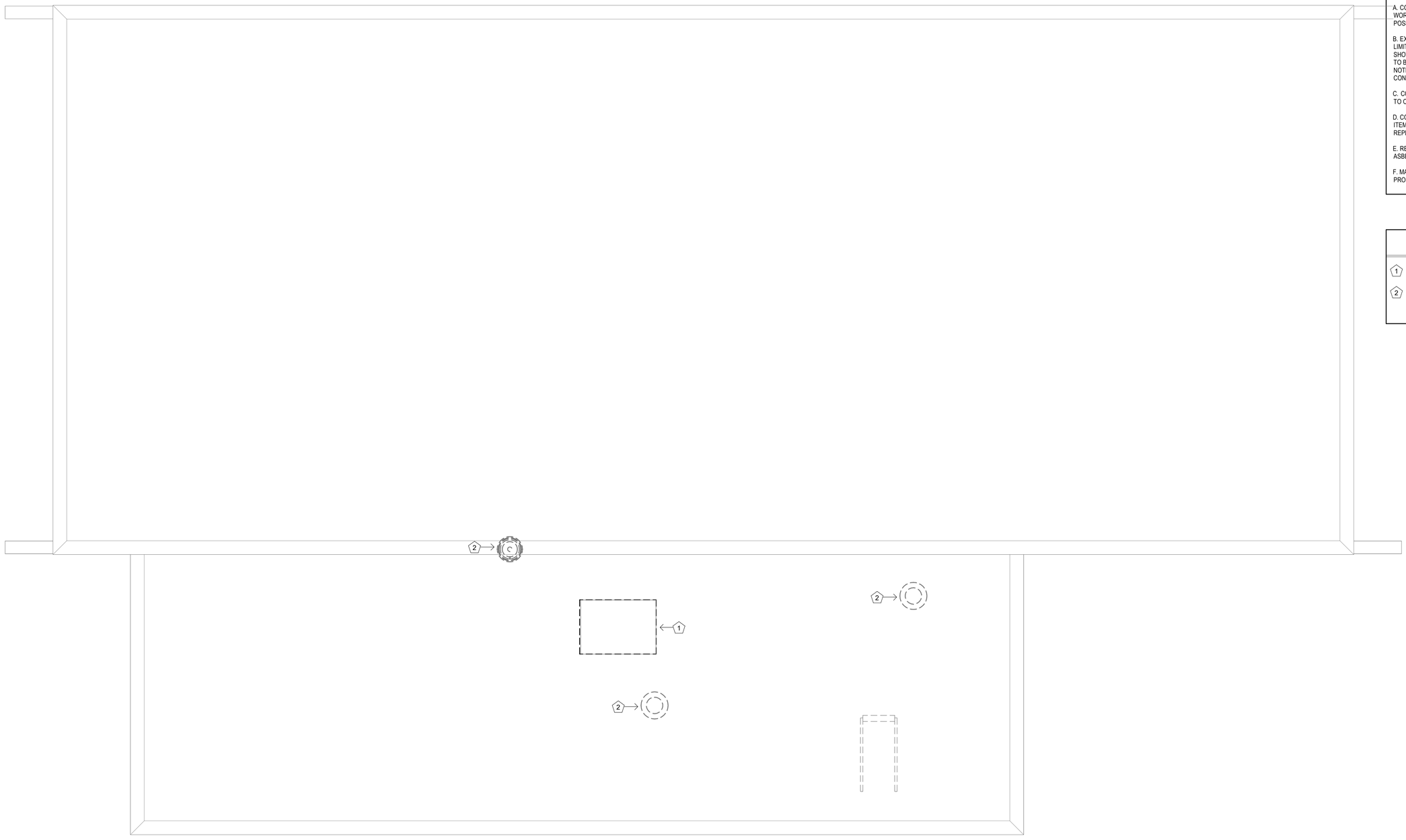
D. CONTRACTOR SHALL BE RESPONSIBLE FOR STORING AND PROTECTING ITEMS SCHEDULED TO BE REINSTALLED. DAMAGED ITEMS SHALL BE REPLACED AT CONTRACTOR'S EXPENSE.

E. REVIEW ARCHITECTURAL DRAWINGS FOR INFORMATION REGARDING ASBESTOS ABATEMENT.

F. MAINTAIN WIRING TO EXISTING FIRE ALARM DEVICES TO REMAIN ENSURE PROPER OPERATION WHEN INSTALLATION IS COMPLETE.

DEMO NOTES

1. EXISTING ROOF TOP UNIT TO REMAIN. ENSURE CIRCUIT IS RECONNECTED TO NEW PANEL.
2. DISCONNECT POWER TO PRV EXHAUST FAN AND MAKE SAFE FOR REMOVAL. REMOVE DISCONNECT AND CONDUCTORS BACK TO SOURCE.



1 ROOF PLAN - ELECTRICAL DEMOLITION
1/4" = 1'-0"

GRAPHIC SCALE
0' 12' 24'

N

2023-34

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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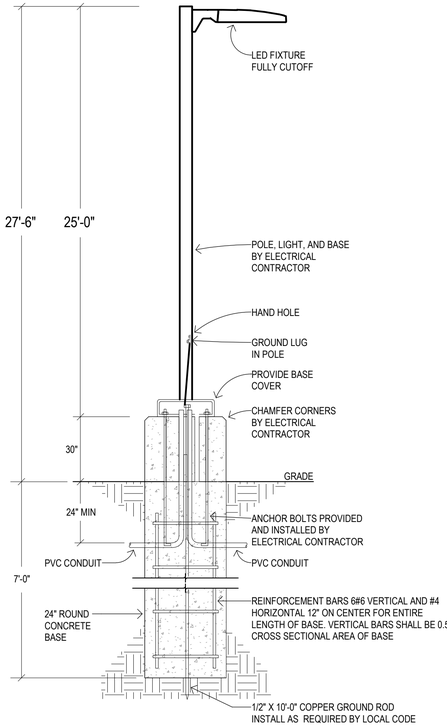
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EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

ROOF PLAN - ELECTRICAL DEMOLITION

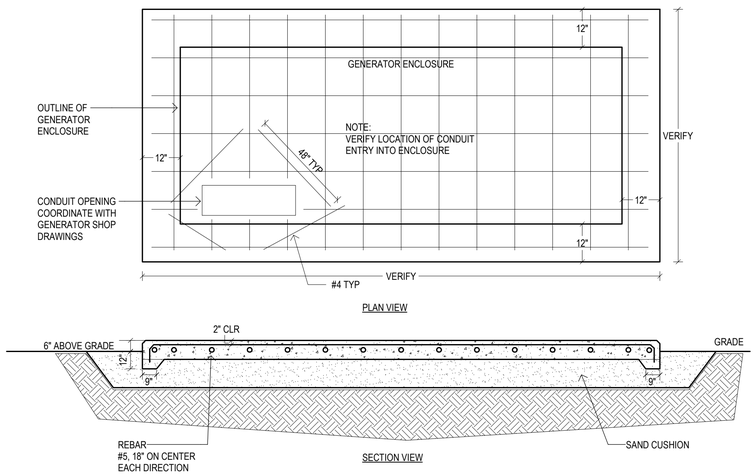
ED1.02

PROJECT #: 2023-34



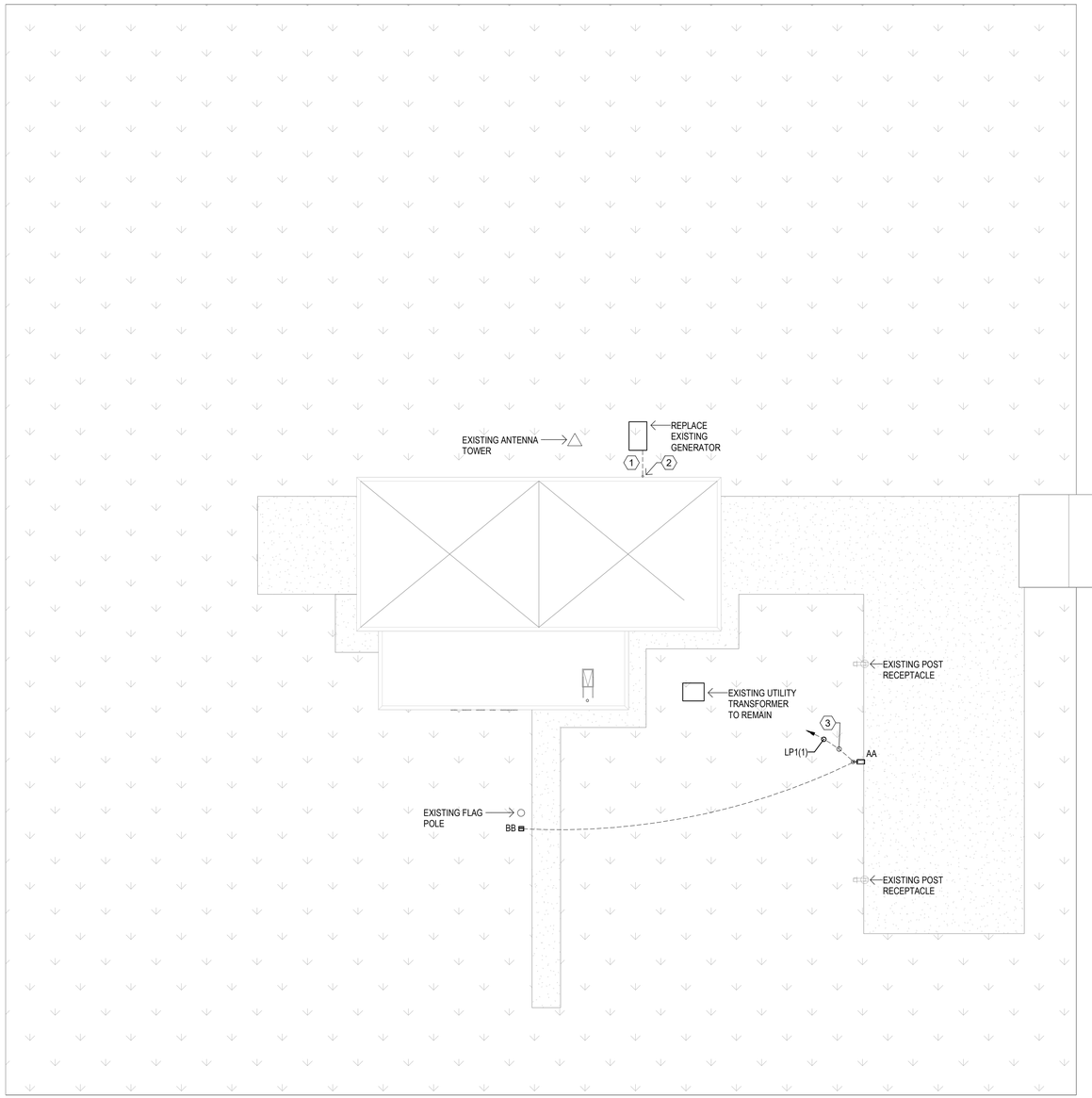
NOTES:
1. TYPICAL FOR ALL AA POLE MOUNTED LIGHTS. SEE PLAN FOR LOCATIONS AND QUANTITY.
2. PROVIDE ONE EXTRA STUBBED AND CAPPED CONDUIT OUT OF EACH BASE TO ACCESSIBLE LOCATION FOR FUTURE EXTENSIONS FOR POWER OR OTHER USE. CONDUIT SHALL BE 1" PVC.
3. CONCRETE SHALL COMPLY WITH DIVISION 3 OF THE PROJECT SPECIFICATIONS FOR 3000 PSI CONCRETE.
4. WHERE REQUIRED BY LOCAL AUTHORITY, PROVIDE A BASE DRAWING DESIGNED BY A REGISTERED STRUCTURAL ENGINEER AND STAMPED BY ENGINEER FOR SUBMISSION TO AHJ.

3 POLE BASE DETAIL
N.T.S.



NOTES:
1. THIS DETAIL IS SHOWN FOR REFERENCE ONLY. CONCRETE PAD WILL BE PROVIDED BY GC. EC SHALL COORDINATE DIMENSIONS AND REQUIRED OPENINGS.
2. PAD SHALL EXTEND 12" BEYOND GENERATOR ENCLOSURE ON ALL FOUR SIDES. VERIFY EXACT PAD DIMENSIONS WITH GENERATOR SUPPLIER.
3. REFER TO STRUCTURAL DRAWINGS.

2 GENERATOR PAD DETAIL
1/8" = 1'-0"



1 SITE PLAN
1" = 20'-0"

GRAPHIC SCALE
0' 30' 60'

N

GENERAL NOTES

A. EXISTING ANTENNA TOWER AND CABLING SHALL BE REMOVED BY THE OWNER. NEW ANTENNAS AND CABLING WILL BE INSTALLED BY OWNER'S CONTRACTOR.

B. EXISTING GENERATOR IS A PORTABLE TYPE GENERATOR. THE ELECTRICAL CONTRACTOR SHALL REMOVE THE GENERATOR AND TURN OVER TO OWNER.

C. ELECTRICAL CONTRACTOR SHALL PROVIDE NEW GENERATOR AS SPECIFIED AND AS INDICATED IN THE DRAWINGS. PROVIDE CONCRETE PAD AND ALL NEW FEEDERS. THIS CONTRACTOR SHALL BEAR THE COSTS TO CUT AND PATCH CONCRETE AS REQUIRED FOR UNDERGROUND FEEDERS.

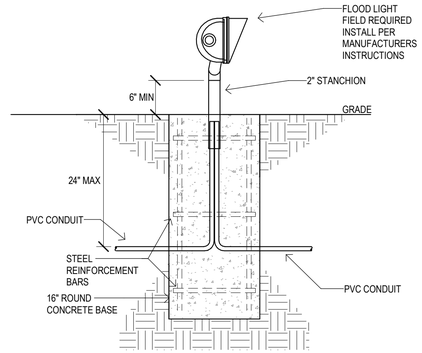
D. CONTRACTOR SHALL BE RESPONSIBLE FOR BACKFILLING AND TRENCHING FOR HIS WORK, AS WELL AS SITE RESTORATION AS IT PERTAINS TO THEIR WORK. THE SELECT BACKFILL MATERIAL MUST NOT CONTAIN ANY SHARP OR FOREIGN OBJECTS.

E. THE ELECTRICAL CONTRACTOR SHALL COORDINATE AS NECESSARY ALL UNDERGROUND LOCATIONS WITH OTHER TRADES PRIOR TO DIGGING BEING DONE.

F. COORDINATE ANY POWER SHUTDOWNS WITH OWNER 7 DAYS PRIOR TO SHUDTOWN. LENGTH OF SHUTDOWNS SHALL BE MINIZED AS MUCH AS POSSIBLE.

SHEET NOTES

1. COORDINATE CONCRETE REMOVAL WITH GC FOR NEW UNDERGROUND CONDUITS AND GENERATOR PAD.
2. ROUTE NEW CONDUIT EXPOSED ON EXTERIOR OF BUILDING AND PENETRATE INTO BUILDING UP HIGH AT TRUSS LEVEL. FIELD COORDINATE CONDUIT ROUTING WITH EXISTING CONDITIONS.
3. ROUTE THROUGH LIGHTING CONTROL PANEL.



NOTE:
1. SEE PLAN FOR LOCATION AND TOTAL NUMBER.

4 FLOOD LIGHT BASE DETAIL
N.T.S.

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SITE PLAN - ELECTRICAL

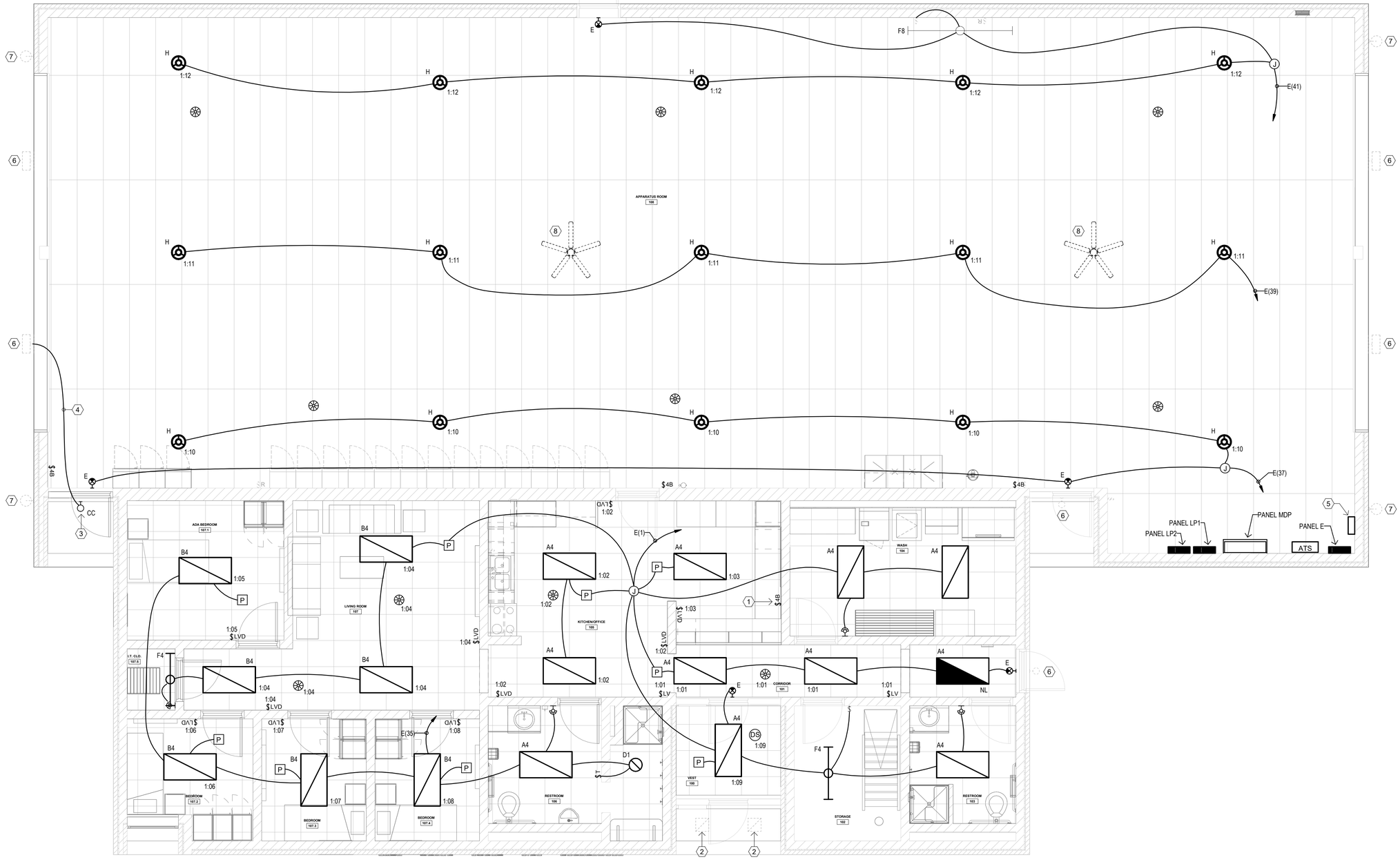
E1.01

PROJECT #: 2023-34

2023-34

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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1 FIRST LEVEL FLOOR PLAN - LIGHTING
1/4" = 1'-0"

GRAPHIC SCALE
0' 6' 12'

N

GENERAL NOTES

A. EXIT, EMERGENCY, AND NIGHT LIGHTS SHALL BE CIRCUITED TO UNSWITCHED CONDUCTOR.

B. PROVIDE A SEPARATE NEUTRAL FOR EACH CIRCUIT. MULTI-WIRE BRANCH CIRCUITS ARE NOT PERMITTED UNLESS NOTED OTHERWISE.

C. PROVIDE ALL BRANCH CIRCUIT WIRING AS REQUIRED FOR COMPLETE INSTALLATION AND OPERATION. PROVIDE ALL 0-10V WIRING AS REQUIRED FOR COMPLETE INSTALLATION AND OPERATION. 0-10V WIRING SHALL BE IN CONDUIT WHERE CEILINGS ARE EXPOSED OR BE PLENUM RATED CABLE ABOVE ACCESSIBLE CEILINGS AND COMPLY WITH NEC CLASS 2 WIRING METHODS.

D. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF LIGHT FIXTURES.

E. VERIFY CEILING CONSTRUCTION WITH ARCHITECTURAL DRAWINGS AND GENERAL CONTRACTOR. PROVIDE ALL NECESSARY MOUNTING HARDWARE FOR COMPLETE INSTALLATION OF LIGHT FIXTURES.

F. WHERE RECESSED FIXTURES ARE INSTALLED IN FIRE RATED CEILINGS, PROVIDE FIRE RATED BOX OR ENCLOSURE AS REQUIRED TO MAINTAIN RATING OF CEILING.

G. COORDINATE LIGHT FIXTURE LOCATIONS AND RACEWAY INSTALLATION WITH MECHANICAL EQUIPMENT AND DUCTWORK AND PIPING SYSTEMS PRIOR TO ROUGH-IN. LIGHT FIXTURE LOCATIONS TAKE PRECEDENCE.

H. CAULK/SEAL ALL WALL PENETRATIONS WITH APPROPRIATE SEALANT. PENETRATIONS THROUGH FIRE RATED WALLS/CEILINGS SHALL BE SEALED WITH AN APPROVED FIRESTOP SYSTEM FOR THE RATING OF THE ASSEMBLY.

I. DO NOT ROUTE CONDUITS EXPOSED ON EXTERIOR OF BUILDING.

SHEET NOTES

1. 4-BUTTON SCENE SWITCH TO CONTROL LIGHTS. SEE DETAIL ON E7.01.
2. PROVIDE LED RETROFIT KIT FOR EXISTING RECESSED LIGHT.
3. MATCH MOUNTING HEIGHT OF EXISTING CYLINDER SCONCES AT OTHER ENTRANCES.
4. CONNECT NEW LIGHT TO EXISTING LIGHTING CIRCUIT.
5. PROVIDE NEW LIGHTING CONTROL PANEL. INTERCEPT CIRCUITS FOR EXTERIOR LIGHTS AND ROUTE THROUGH LIGHTING CONTROL PANEL.
6. EXISTING WALL PACK FOR GENERAL EXTERIOR LIGHTING. INTERCEPT CIRCUIT AND ROUTE THROUGH NEW LIGHTING CONTROL PANEL.
7. EXISTING RED LIGHT FOR EMERGENCY NOTIFICATION. INTERCEPT CIRCUIT AND ROUTE THROUGH NEW LIGHTING CONTROL PANEL.
8. EXISTING CEILING FAN TO REMAIN: ENSURE CIRCUITRY IS CONNECTED TO NEW PANEL AND FANS OPERATE PROPERLY.

2023-34

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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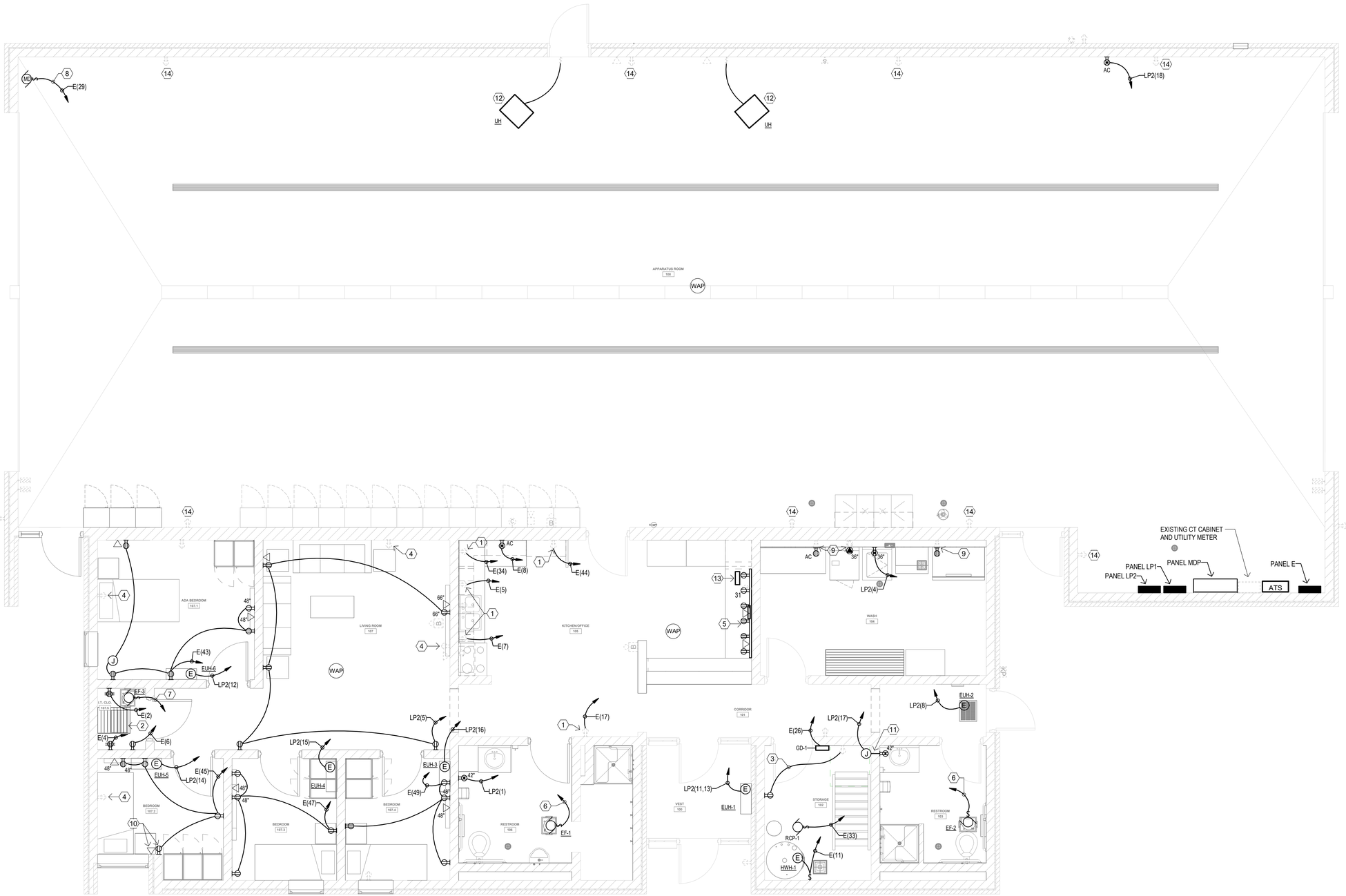
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EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

FIRST LEVEL FLOOR PLAN - LIGHTING

E2.01

PROJECT #: 2023-34



1 FIRST LEVEL FLOOR PLAN - POWER AND SYSTEMS
1/4" = 1'-0"

GRAPHIC SCALE
0' 12' 24'

N

GENERAL NOTES

A. SEE ARCHITECTURAL DRAWINGS FOR WALL TYPES. SEAL ALL WALL PENETRATIONS WITH APPROPRIATE SEALANT. COORDINATE FIRE PROOFING REQUIREMENTS FOR PENETRATIONS AND PROVIDE UL LISTED FIRESTOP SYSTEM AS REQUIRED.

B. MECHANICAL EQUIPMENT IS SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL REVIEW MECHANICAL DRAWINGS AND COORDINATE ELECTRICAL EQUIPMENT LOCATIONS WITH MECHANICAL EQUIPMENT, DUCT WORK AND PIPING. COORDINATE EQUIPMENT CONNECTION REQUIREMENTS WITH SHOP DRAWINGS. MAKE ALL WIRING CONNECTIONS AS REQUIRED.

C. ALL 120V CIRCUITS SHALL HAVE SEPARATE NEUTRALS. MULTI-WIRE BRANCH CIRCUITS ARE NOT PERMITTED UNLESS NOTED OTHERWISE.

D. ALL RECEPTACLES SHALL BE TAMPER PROOF TYPE.

E. GFCI RECEPTACLES SHALL BE WIRED TO PROTECT ONLY THAT DEVICE AND NOT DOWNSTREAM DEVICES UNLESS NOTED OTHERWISE.

F. COORDINATE MOUNTING HEIGHTS OF DEVICES WITH ARCHITECTURAL ELEVATIONS.

SHEET NOTES

1. RECIRCUIT RECEPTACLE TO BE ON A DEDICATED CIRCUIT. REPLACE DEVICE WITH NEW AND PROVIDE NEW COVER PLATE.
2. RELOCATE IT RACK TO THIS LOCATION. COORDINATE WITH OWNER.
3. CONNECT NEW RECEPTACLE TO RECEPTACLE CIRCUIT.
4. REPLACE EXISTING DEVICE WITH NEW AND PROVIDE NEW COVER PLATE. REUSE BOX AND CIRCUITRY.
5. PROVIDE 2-CHANNEL SURFACE RACEWAY ABOVE COUNTER.
6. CONNECT TO LIGHTING CIRCUIT SERVING THIS ROOM. EF TO BE CONTROLLED WITH LIGHTS.
7. CONNECT TO LIGHTING CIRCUIT SERVING THIS ROOM. ROUTE CIRCUIT THROUGH THERMOSTAT. EF TO BE CONTROLLED BY THERMOSTAT. COORDINATE WITH MECHANICAL.
8. PROVIDE CONNECTION TO MOTORIZED DAMPER. ROUTE CIRCUIT THROUGH GAS DETECTION SYSTEM. COORDINATE WITH MECHANICAL.
9. BRING EXISTING BOX OUT TO FURRED WALL. RECIRCUIT RECEPTACLE TO BE ON A DEDICATED CIRCUIT. REPLACE DEVICE WITH NEW AND PROVIDE NEW COVER PLATE.
10. SURFACE MOUNT NEW DEVICE.
11. PROVIDE JUNCTION BOX AND CONDUIT TO FEED NEW DEVICE FLUSH MOUNTED IN BLOCK WALL.
12. RECONNECT POWER TO NEW GAS UNIT HEATER.
13. GENERATOR ANNUCIATOR PANEL. COORDINATE LOCATION WITH GENERAL CONTRACTOR.
14. REPLACE EXISTING RECEPTACLE WITH NEW GFCI TAMPER PROOF RECEPTACLE AND PROVIDE NEW COVER PLATE.

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EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

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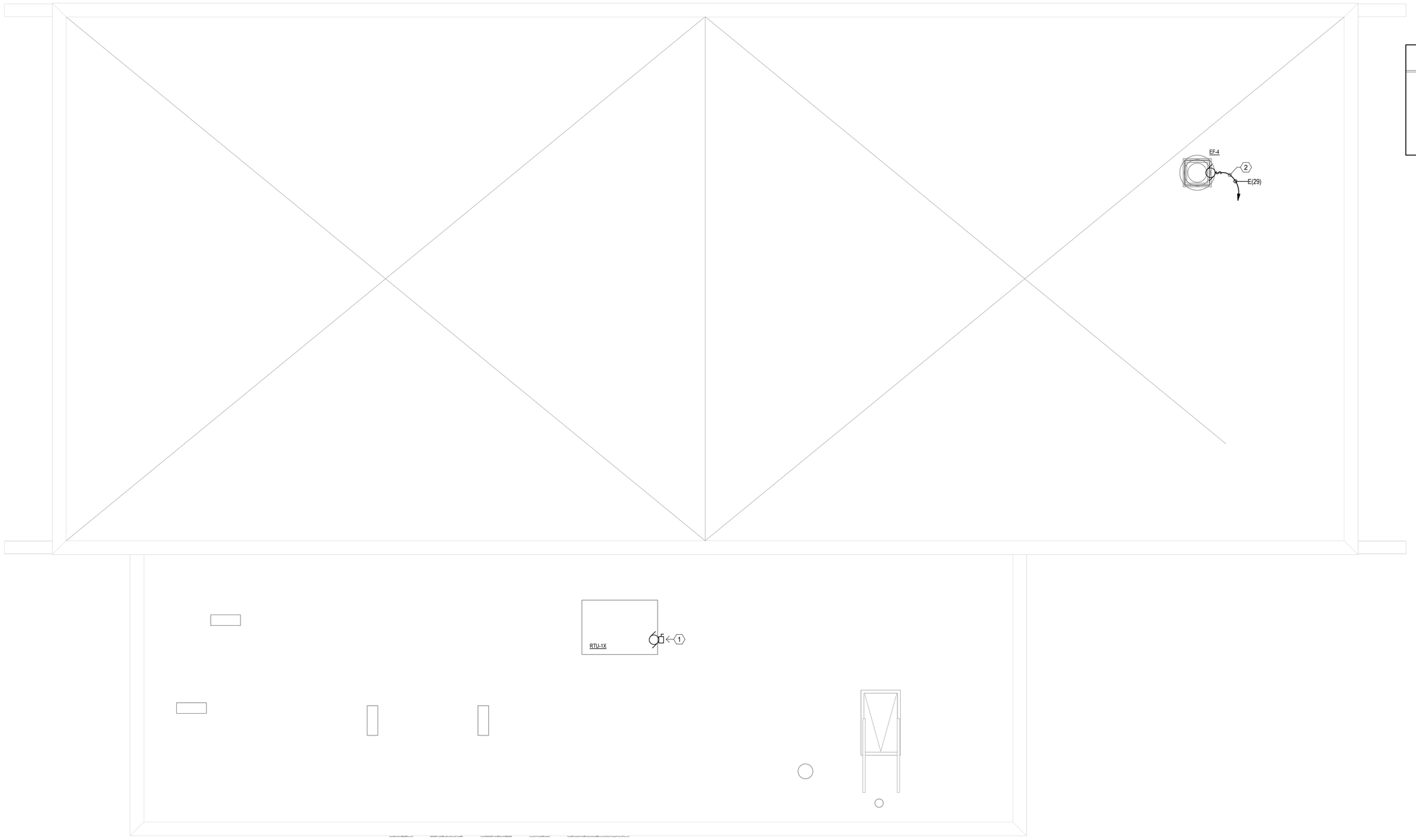
FIRST LEVEL FLOOR PLAN - POWER

E3.01

PROJECT #: 2023-34

SHEET NOTES

1. EXISTING ROOF TOP UNIT POWER CONNECTION TO REMAIN AS-IS, NO CHANGE. CONNECT FEEDER TO NEW PANEL E. REFER TO PANEL SCHEDULE.
2. ROUTE THROUGH GAS DETECTION SYSTEM. INTERLOCK WITH MOTORIZED DAMPER.



1 HIGH ROOF
1/4" = 1'-0"

GRAPHIC SCALE
0' 6' 12'

N

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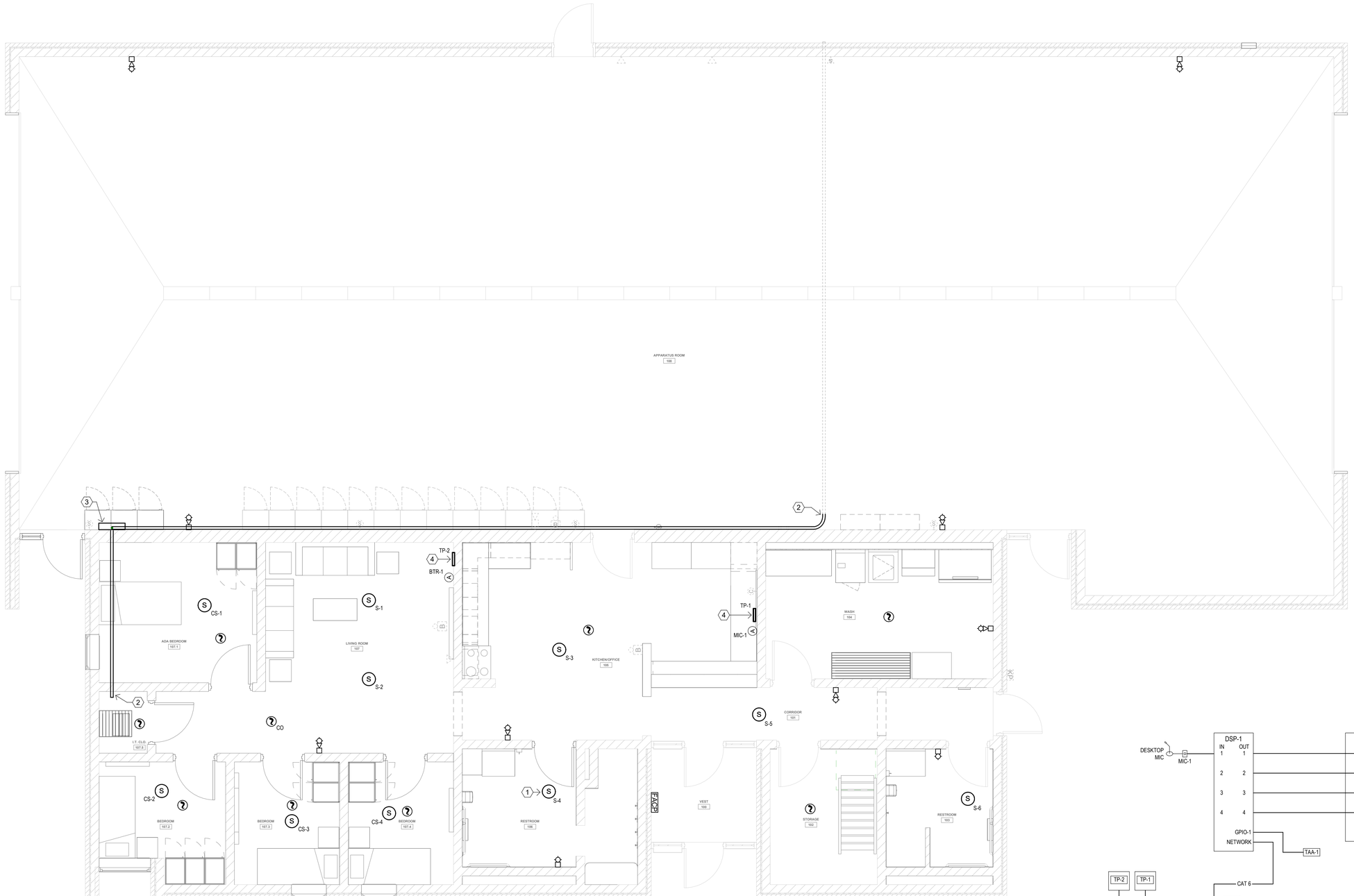
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ROOF PLAN - POWER

E3.02

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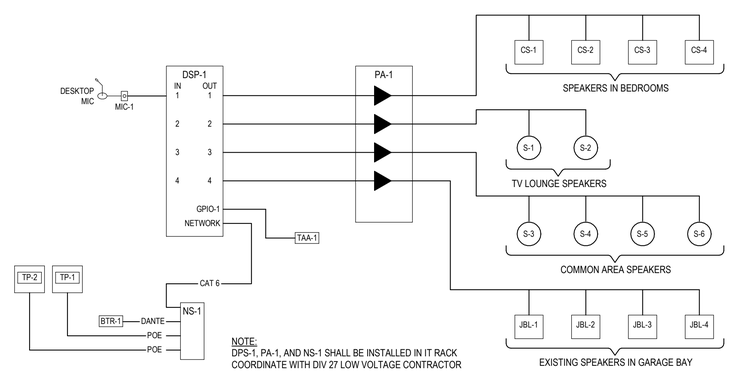
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1 FIRST LEVEL FLOOR PLAN - SYSTEMS
1/4" = 1'-0"

GRAPHIC SCALE
0' 6' 12'

N



NOTE:
DPS-1, PA-1, AND NS-1 SHALL BE INSTALLED IN IT RACK
COORDINATE WITH DIV 27 LOW VOLTAGE CONTRACTOR

2 AUDIO FLOW 1-LINE DIAGRAM
N.T.S.

GENERAL NOTES

A. FIRE ALARM STROBE DEVICES SHALL BE 15 CANDELLA UNLESS NOTED OTHERWISE.

B. CONTRACTOR SHALL REVIEW ARCHITECTURAL DRAWINGS AND ELEVATIONS TO COORDINATE MOUNTING HEIGHTS.

C. COORDINATE SECURITY SYSTEM REQUIREMENTS WITH OWNERS SECURITY SCONTRACTOR.

D. CONTRACTOR SHALL COORDINATE FLOOR BOX LOCATIONS, ALL OFFICE DEVICE LOCATIONS, ALL FURNITURE PANEL AND EQUIPMENT LOCATIONS, WITH SPECIFIC DIMENSIONS PROVIDED BY ARCHITECT.

SHEET NOTES

1. REPLACE EXISTING SPEAKER IN NEW CEILING.
2. INTERCEPT EXISTING 2" C. OVERHEAD FOR INCOMING FIBER AND REROUTE TO RACK IN NEW IT CLOSET. REINSTALL FIBER .
3. PROVIDE NEW JUNCTION BOX FOR LOW VOLTAGE CONDUIT.
4. PROVIDE AV CONTROL TOUCH PANEL. COORDINATE LOCATION WITH GENERAL CONTRACTOR.

2023-34

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EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

FIRST LEVEL FLOOR PLAN - SYSTEMS

E4.01

PROJECT #: 2023-34

MOTOR AND EQUIPMENTSCHEDULE

EQUIP ID	EQUIPMENT DESCRIPTION	RATINGS							CONTROLLER				DISCONNECT			CONTROLS			NOTES
		VOLT	PH	HP	KW	FLA	MCA	MOCP	BY	TYPE	SIZE	LOCATION	BY	SIZE/TYPE	LOCATION	BY	TYPE	INTERLOCK	
WH-1	GAS WATER HEATER	120	1	.	.	11	.	20	MC	SC	.	WITH UNIT	EC	SW	AT UNIT	.	.	.	.
RCP-1	RECIRCULATING PUMP	120	1	0.5	.	9.8	.	20	MC	AQ	.	WITH UNIT	EC	SW	AT UNIT	TC	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
GUH-1	GAS UNIT HEATER	120	1	.	.	6.75	.	15	MC	TS	.	WITH UNIT	EC	SW	AT UNIT	TC	.	.	.
GUH-2	GAS UNIT HEATER	120	1	.	.	6.75	.	15	MC	TS	.	WITH UNIT	EC	SW	AT UNIT	TC	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
EUH-1	ELECTRIC UNIT HEATER	208	1	.	4.0	19.2	.	30	MC	TS	.	WITH UNIT	EC	CB	PANEL	.	.	.	3
EUH-2	ELECTRIC UNIT HEATER	120	1	.	1.5	12.5	.	20	MC	TS	.	WITH UNIT	EC	CB	PANEL	.	.	.	3
EUH-3	ELECTRIC UNIT HEATER	120	1	.	1.0	8.3	.	20	MC	TS	.	WITH UNIT	EC	CB	PANEL	.	.	.	3
EUH-4	ELECTRIC UNIT HEATER	120	1	.	1.0	8.3	.	20	MC	TS	.	WITH UNIT	EC	CB	PANEL	.	.	.	3
EUH-5	ELECTRIC UNIT HEATER	120	1	.	1.0	8.3	.	20	MC	TS	.	WITH UNIT	EC	CB	PANEL	.	.	.	3
EUH-6	ELECTRIC UNIT HEATER	120	1	.	1.0	8.3	.	20	MC	TS	.	WITH UNIT	EC	CB	PANEL	.	.	.	3
EF-1	CEILING EXHAUST FAN	120	1	.	0.032	.	.	15	EC	SW	.	IN ROOM	EC	CB	PANEL	.	.	.	1,4
EF-2	CEILING EXHAUST FAN	120	1	.	0.032	.	.	15	EC	OS	.	IN ROOM	EC	CB	PANEL	.	.	.	1,4
EF-3	CEILING EXHAUST FAN	120	1	.	0.028	.	.	15	EC	OS	.	IN ROOM	EC	CB	PANEL	.	.	.	1,4
EF-4	EXHAUST FAN	120	1	3/4	.	13.8	.	25	EC	VFD	.	AT UNIT	EC	D23F	AT UNIT	TC	DDC	GAS DET	2,4
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
GD-1	GAS DETECTION	120	1	.	.	10	.	15	MC	SC	.	WITH UNIT	EC	CB	PANEL	.	.	.	.

LEGEND:

EC ELECTRICAL CONTRACTOR
MC MECHANICAL CONTRACTOR
TC TEMPERATURE CONTROL CONTRACTOR

M MAGNETIC
MM MANUAL
SS SOFT START
VFD VARIABLE FREQUENCY DRIVE
CSD COMBINATION TYPE
SC SELF CONTAINED
OS OCCUPANCY SENSOR

Dxx DISCONNECT SWITCH
CB CIRCUIT BREAKER
DDC DIRECT DIGITAL CONTROL
SW SWITCH
TS THERMOSTAT
REC RECEPTACLE
CP CONTROL PANEL

NOTES:
1. CEILING EXHAUST FANS CONNECTED TO LIGHTING CIRCUIT AND CONTROLLED BY LIGHTING CONTROL IN ROOM.
2. INTERFACE WITH GAS DETECTION SYSTEM. REFER TO MECHANICAL DRAWINGS FOR SEQUENCE OF OPERATION REQUIREMENTS.
3. ELECTRIC HEATERS ARE PROVIDED BY MECHANICAL, INSTALLED BY ELECTRICAL CONTRACTOR.
4. PROVIDE CONNECTION TO BACKDRAFT DAMPER. COORDINATE WITH MECHANICAL.

PANEL MDP

LOCATION	APPARATUS ROOM 108	VOLT	120/208 Wye	A.I.C. RATING	65,000
FED FROM		PHASES	3	MAINS	MCB
MOUNTING		WIRES	4	MAINS RATING	600 A
ENCLOSURE	NEMA 1				

OPTIONS:

LOAD DESCRIPTION	AMP	POLE	TYPE	CKT NO.	LOAD (KVA...		LOAD (KVA...		LOAD (KVA...		CKT NO.	TYPE	POLE	AMP	LOAD DESCRIPTION
PANEL E	225 A	3		1	17.45	22.70					2		3	225 A	PANEL LP1
--	--	--	--	3			11.05	27.88			4	--	--	--	--
--	--	--	--	5					14.37	26.36	6	--	--	--	--
SPACE	--	1		7	--	5.90					8		3	225 A	PANEL LP2
SPACE	--	1		9			--	5.44			10	--	--	--	--
SPACE	--	1		11					--	4.94	12	--	--	--	--
SPACE	--	1		13	--	--					14		1	--	SPACE
SPACE	--	1		15			--	--			16		1	--	SPACE
SPACE	--	1		17					--	--	18		1	--	SPACE
SPACE	--	1		19	--	--					20		1	--	SPACE
SPACE	--	1		21			--	--			22		1	--	SPACE
SPACE	--	1		23					--	--	24		1	--	SPACE
SPACE	--	1		25	--	--					26		1	--	SPACE
SPACE	--	1		27			--	--			28		1	--	SPACE
SPACE	--	1		29					--	--	30		1	--	SPACE
SPACE	--	1		31	--	--					32		1	--	SPACE
SPACE	--	1		33			--	--			34		1	--	SPACE
SPACE	--	1		35					--	--	36		1	--	SPACE
SPACE	--	1		37	--	--					38		1	--	SPACE
SPACE	--	1		39			--	--			40		1	--	SPACE
SPACE	--	1		41					--	--	42		1	--	SPACE
			Total Load:		46.05 kVA		44.37 kVA		45.67 kVA						
			Total Amps:		385 A		370 A		382 A						

LEGEND:

NOTES:

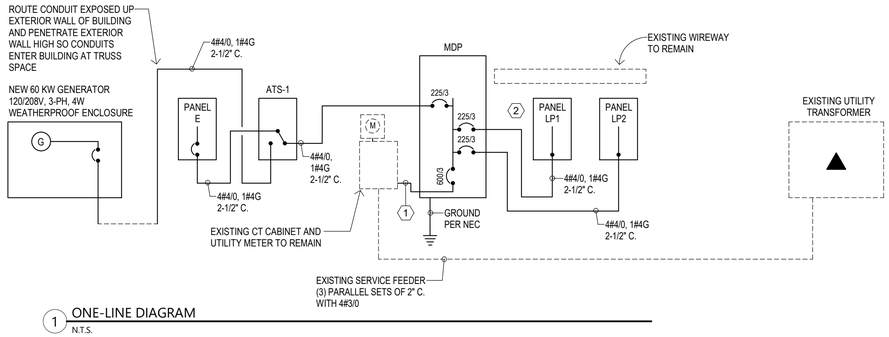
LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC	14020 VA	100.00%	14020 VA		
Lighting	2501 VA	100.00%	2501 VA	TOTAL CONNECTED LOAD:	136.10 kVA
Lighting - Exterior	6 VA	125.00%	8 VA	TOTAL ESTIMATED LOAD:	116.65 kVA
Motor	11570 VA	110.80%	12820 VA	TOTAL CONNECTED:	378 A
Other	2080 VA	100.00%	2080 VA	TOTAL ESTIMATED DEMAND:	324 A
Power	11502 VA	100.00%	11502 VA		
Receptacle	22720 VA	72.01%	16360 VA		
Spare	71700 VA	80.00%	57360 VA		

1. MINIMUM ENCLOUSRE HEIGHT SHALL BE 72". FIELD VERIFY WITH EXISTING PANEL DIMENSIONS AND WALL SPACE.

AUTOMATIC TRANSFER SWITCH SCHEDULE

NUMBER	AMP	VOLTAGE	POLES	LOCATION	NOTES
ATS-1	250	208 VOLT, 3-PHASE, 4-WIRE	3	TRUCK BAY	1
					.

NOTES:
1. WALL MOUNT ENCLOSURE. FIELD VERIFY WALL SPACE REQUIRED. MODIFY EXISTING COMPONENTS AS REQUIRED TO PROPERLY INSTALL THE ATS.



1 ONE-LINE DIAGRAM
N.T.S.

ONE-LINE DIAGRAM NOTES

1. REPLACE EXISTING CONDUIT AND WIRE BETWEEN CT CABINET AND NEW MDP. FEEDER SHALL BE (3) 2" C.'S WITH 4#3/0, 1#1/0G IN EACH.
2. RECONNECT ALL EXISTING BRANCH CIRCUITS THAT ARE TO REMAIN TO NEW PANELS. VERIFY CIRCUIT BREAKER SIZES PRIOR TO ORDERING PANELS. FIELD VERIFY EXISTING CONDITIONS. MODIFY EXISTING CONDUITS AS REQUIRED FOR NEW PANEL ENCLOSURES.

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APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

ONE-LINE DIAGRAM

E6.01

PROJECT #: 2023-34

2023-34

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

PANEL E

LOCATION	APPARATUS ROOM 108	VOLT	120/208 Wye	A.I.C. RATING	22,000
FED FROM	MDP	PHASES	3	MAINS	MCB
MOUNTING	SURFACE	WIRES	4	MAINS RATING	225 A
ENCLOSURE	TYPE 1				

OPTIONS:

LOAD DESCRIPTION	AMP	POLE	TYPE	CKT NO.	A		B		C		CKT NO.	TYPE	POLE	AMP	LOAD DESCRIPTION
COMMON AREA LIGHTS	20 A	1		1	1.24	0.36					2		1	20 A	RECEPTACLE - IT CLOSET
SPARE	20 A	1		3			0.00	0.36			4		1	20 A	RECEPTACLE - IT CLOSET
KITCHEN APPLIANCE RECEPTACLE	20 A	1		5					0.18	0.18	6		1	20 A	RECEPTACLE - IT CLOSET
KITCHEN APPLIANCE RECEPTACLE	20 A	1		7	0.18	0.18					8		1	20 A	RECEPTACLE - KITCHEN
RECEPTACLE - OFFICE	20 A	1		9			0.18	0.60			10		1	15 A	ALARM ALERT HORNS
WATER HEATER HWH-1	20 A	1		11					0.10	0.20	12		1	20 A	SHOP OUTLET
OUTSIDE EAST OUTLETS	20 A	1		13	0.60	1.20					14		1	20 A	SOUTHWEST OH DOOR OPENER
OUTSIDE EAST OUTLETS	20 A	1		15			0.60	1.20			16		1	20 A	NORTHWEST OH DOOR OPENER
RECEPTACLE - KITCHEN	20 A	1		17					0.18	0.02	18		1	20 A	SHOP FANS
AIR COMPRESSOR	20 A	2		19	1.00	2.33					20		3	40 A	(E) RTU-1X
--	--	--	--	21			1.00	2.33			22	--	--	--	--
SOUTHEAST OH DOOR OPENER	20 A	1		23					1.20	2.33	24	--	--	--	--
NORTHEAST OH DOOR OPENER	20 A	1		25	1.20	0.50					26		1	20 A	GAS DETECTION PANEL
OFFICE STOR/STOR RECEPT	20 A	1		27			1.00	0.40			28		1	15 A	DATA OUTLET ABOVE PANEL
EF-4	20 A	1		29					0.90	5.05	30		1	20 A	NW GAS UNIT HEATER
RECEPTACLE - OFFICE	20 A	1		31	0.18	0.40					32		1	20 A	OFFICE HALL STOR RECEPTACLE
RCP-1	20 A	1		33			1.10	0.18			34	G	1	20 A	RECEPTACLE - REFRIGERATOR
BUNK ROOM LIGHTS	20 A	1		35					0.29	1.50	36		1	20 A	KITCHEN OUTLETS
BAY LIGHTS	20 A	1		37	0.60	5.50					38		1	20 A	NE GAS UNIT HEATER
BAY LIGHTS	20 A	1		39			0.60	--			40		1	--	SPACE
BAY LIGHTS	20 A	1		41					0.60	--	42		1	--	SPACE
RECEPTACLES - BEDRM 107.1	20 A	1	AF	43	1.08	0.18					44		1	20 A	KITCHEN APPLIANCE RECEPTACLE
RECEPTACLES - BEDRM 107.2	20 A	1	AF	45			0.90	0.60			46		1	20 A	PARKING LOT, SIDE ENTRY LIGHT
RECEPTACLES - BEDRM 107.3	20 A	1	AF	47					0.54	0.60	48		1	20 A	LIGHTS, RED LIGHTS, OH DOOR LIGHTS
RECEPTACLES - BEDRM 107.4	20 A	1	AF	49	0.72	0.00					50		1	20 A	SPARE
SPARE	20 A	1		51			0.00	0.00			52		1	20 A	SPARE
LIGHTING CONTROL PANEL	20 A	1		53					0.50	0.00	54		1	20 A	SPARE
			Total Load:		17.45 kVA		11.05 kVA		14.37 kVA						
			Total Amps:		150 A		92 A		124 A						

LEGEND:

NOTES:

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC	14020 VA	100.00%	14020 VA		
Lighting	2310 VA	100.00%	2310 VA	**TOTAL CONNECTED LOAD:**	42.88 kVA
Motor	11570 VA	110.80%	12820 VA	**TOTAL ESTIMATED LOAD:**	42.43 kVA
Other	900 VA	100.00%	900 VA	**TOTAL CONNECTED:**	119 A
Power	2 VA	100.00%	2 VA	**TOTAL ESTIMATED DEMAND:**	118 A
Receptacle	5580 VA	100.00%	5580 VA		
Spare	8500 VA	80.00%	6800 VA		

PANEL LP1

LOCATION	APPARATUS ROOM 108	VOLT	120/208 Wye	A.I.C. RATING	22,000
FED FROM	MDP	PHASES	3	MAINS	MLO
MOUNTING	SURFACE	WIRES	4	MAINS RATING	225 A
ENCLOSURE	TYPE 1				

OPTIONS:

LOAD DESCRIPTION	AMP	POLE	TYPE	CKT NO.	A		B		C		CKT NO.	TYPE	POLE	AMP	LOAD DESCRIPTION
SITE LIGHTING	20 A	1		1	0.21	3.00					2	1	3	40 A	VEHICLE EXHAUST FAN SYSTEM
SPARE	20 A	1		3			0.40	3.00			4	--	--	--	--
EXISTING LOAD	20 A	1	1	5					1.00	3.00	6	--	--	--	--
GARAGE RECEPT AND OUTSIDE RECEPT	20 A	1	G	7	0.40	3.00					8	1	2	50 A	EXISTING LOAD
GARAGE RECEPTACLE	20 A	1	G	9			0.40	3.00			10	--	--	--	--
EXISTING LOAD FROM CKT 2-4-6	30 A	3	1	11					2.00	1.50	12	1,G	2	20 A	AIR COMPRESSOR
--	--	--	--	13	2.00	1.50					14	--	--	--	--
--	--	--	--	15			2.00	0.00			16		1	20 A	SPARE
SPARE	20 A	1		17					0.00	0.00	18		1	20 A	SPARE
NE GARAGE HEATER	40 A	3	1	19	3.00	0.40					20	G	1	20 A	OUTSIDE RECEPTACLE
--	--	--	--	21			3.00	4.00			22	1,G	2	50 A	RANGE
--	--	--	--	23					3.00	4.00	24	--	--	--	--
GARAGE HEATER	40 A	3	1	25	3.00	0.20					26		1	20 A	EX FAN PUBLIC RESTROOMS
--	--	--	--	27			3.00	0.40			28		1	20 A	OUTSIDE RECEPTACLE
--	--	--	--	29					3.00	0.18	30		1	20 A	WASHER
HOSE DRYER	40 A	3	1	31	3.00	0.00					32		1	20 A	SPARE
--	--	--	--	33			3.00	0.18			34		1	20 A	OUTSIDE POST CAR HEATER RECEPTACLE
--	--	--	--	35					3.00	0.18	36		1	20 A	OUTSIDE POST CAR HEATER RECEPTACLE
SW GARAGE HEATER	40 A	3	1	37	3.00	0.00					38		1	20 A	SPARE
--	--	--	--	39			3.00	2.50			40	G	2	30 A	DRYER
--	--	--	--	41					3.00	2.50	42	--	--	--	--
SPACE	--	1		43	--	--					44		1	--	SPACE
SPACE	--	1		45			--	--			46		1	--	SPACE
SPACE	--	1		47					--	--	48		1	--	SPACE
SPACE	--	1		49	--	--					50		1	--	SPACE
SPACE	--	1		51			--	--			52		1	--	SPACE
SPACE	--	1		53					--	--	54		1	--	SPACE
			Total Load:		22.70 kVA		27.88 kVA		26.36 kVA						
			Total Amps:		189 A		237 A		224 A						

LEGEND:

NOTES:

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
Lighting	200 VA	100.00%	200 VA		
Lighting - Exterior	6 VA	125.00%	8 VA	**TOTAL CONNECTED LOAD:**	76.94 kVA
Receptacle	13540 VA	86.93%	11770 VA	**TOTAL ESTIMATED LOAD:**	62.53 kVA
Spare	63200 VA	80.00%	50560 VA	**TOTAL CONNECTED:**	214 A
				TOTAL ESTIMATED DEMAND:	174 A

NOTES:
1. VERIFY LOAD ON EXISTING PANEL TO BE RECONNECTED TO NEW PANEL

PANEL LP2

LOCATION	APPARATUS ROOM 108	VOLT	120/208 Wye	A.I.C. RATING	22,000
FED FROM	MDP	PHASES	3	MAINS	MLO
MOUNTING	SURFACE	WIRES	4	MAINS RATING	225 A
ENCLOSURE	TYPE 1				

OPTIONS:

LOAD DESCRIPTION	AMP	POLE	TYPE	CKT NO.	A		B		C		CKT NO.	TYPE	POLE	AMP	LOAD DESCRIPTION
RECEPTACLE - RR 106	20 A	1		1	0.18	0.54					2		1	20 A	RECEPTACLES - STOR 102/EXT
RECEPTACLE - CORR 101	20 A	1		3			0.18	1.18			4		1	20 A	WASHER - ROOM 104
RECEPTACLES - LR 107	20 A	1		5					0.90	0.18	6		1	20 A	RECEPTACLE - LR 107 N WALL
RECEPTACLE - LR 107 E WALL	20 A	1		7	0.18	1.50					8		1	20 A	EUH-2
GARBAGE DISPOSAL	20 A	1		9			0.90	0.18			10		1	20 A	RECEPTACLE - OFFICE
EUH-1	30 A	2		11					2.00	1.50	12		1	20 A	EUH-6
--	--	--	--	13	2.00	1.50					14		1	20 A	EUH-5
EUH-4	20 A	1		15			1.50	1.50			16		1	20 A	EUH-3
RECEPTACLE - RESTROOM	20 A	1		17					0.18	0.18	18		1	20 A	RECEPTACLE - WORK BENCH
SPARE	20 A	1		19	0.00	0.00					20		1	20 A	SPARE
SPARE	20 A	1		21			0.00	0.00			22		1	20 A	SPARE
SPARE	20 A	1		23					0.00	0.00	24		1	20 A	SPARE
SPARE	20 A	1		25	0.00	0.00					26		1	20 A	SPARE
SPARE	20 A	1		27			0.00	0.00			28		1	20 A	SPARE
SPARE	20 A	1		29					0.00	0.00	30		1	20 A	SPARE
SPARE	20 A	1		31	0.00	0.00					32		1	20 A	SPARE
SPARE	20 A	1		33			0.00	0.00			34		1	20 A	SPARE
SPARE	20 A	1		35					0.00	0.00	36		1	20 A	SPARE
SPARE	20 A	1		37	0.00	0.00					38		1	20 A	SPARE
SPARE	20 A	1		39			0.00	0.00			40		1	20 A	SPARE
SPARE	20 A	1		41					0.00	0.00	42		1	20 A	SPARE
SPARE	20 A	1		43	0.00	0.00					44		1	20 A	SPARE
SPARE	20 A	1		45			0.00	0.00			46		1	20 A	SPARE
SPARE	20 A	1		47					0.00	0.00	48		1	20 A	SPARE
SPARE	20 A	1		49	0.00	0.00					50		1	20 A	SPARE
SPARE	20 A	1		51			0.00	0.00			52		1	20 A	SPARE
SPARE	20 A	1		53					0.00	0.00	54		1	20 A	SPARE
			Total Load:		5.90 kVA		5.44 kVA		4.94 kVA						
			Total Amps:		50 A		46 A		41 A						

LEGEND:

NOTES:

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
Other	1180 VA	100.00%	1180 VA		
Power	11500 VA	100.00%	11500 VA	**TOTAL CONNECTED LOAD:**	16.28 kVA
Receptacle	3600 VA	100.00%	3600 VA	**TOTAL ESTIMATED LOAD:**	16.28 kVA
				TOTAL CONNECTED:	45 A
				TOTAL ESTIMATED DEMAND:	45 A

NOTE:

FIELD VERIFY ALL EXISTING LOADS TO REMAIN AND CIRCUIT BREAKER SIZES PRIOR TO ORDERING PANELS.

CIRCUIT BREAKER LEGEND:

G: GROUND FAULT CIRCUIT INTERRUPTER TYPE
AF: ARC-FAULT CIRCUIT BREAKER

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DRAWN BY: KS / JB
CHECKED BY: JAB

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

PANEL SCHEDULES

E6.11

PROJECT #: 2023-34

LIGHTING CONTROL SEQUENCE OF OPERATIONS

UNDER NORMAL OPERATION, INDIVIDUAL ROOMS ARE CONTROLLED BY THE LOCAL DEVICE WITHIN IN THE ROOM.

1:01 - CORRIDOR LIGHTS SHALL BE AUTOMATIC ON AND OFF VIA OCCUPANCY SENSOR. TIME OUT SHALL BE 15 MINUTES.

1:02, 1:04 - KITCHEN AND LIVING ROOM LIGHTS SHALL BE MANUAL ON VIA ONE OF THE LOW VOLTAGE DIMMER CONTROL STATIONS. DIMMING SHALL BE MANUAL AND OFF SHALL BE MANUAL OR AUTOMATIC. TIME OUT SHALL BE 30 MINUTES.

1:03 - WORK DESK LIGHT SHALL BE MANUAL ON AND OFF, MANUAL DIMMING.

1:05, 1:06, 1:07, 1:08 - BEDROOM LIGHTS SHALL BE CONTROLLED LOCALLY BY THE LOW VOLTAGE DIMMER CONTROL STATION. LIGHTS SHALL BE MANUAL ON AND OFF, MANUAL DIMMING.

1:09 - MAIN VESTIBULE SHALL BE AUTOMATICALLY CONTROLLED BY A DAYLIGHT SENSOR.

1:10, 1:11, 1:12 - GARAGE BAY LIGHTS SHALL BE MANUAL OR AUTOMATIC ON. WHEN TURNED ON BY THE MANUAL SWITCH, LIGHTS SHALL GO TO THE BRIGHTNESS LEVEL PER THE USER INPUT. IF LIGHTS ARE TURNED ON AUTOMATICALLY VIA THE OCCUPANCY SENSOR, THEY SHALL GO TO 50% BRIGHTNESS. LIGHTS SHALL REMAIN ON WHEN OCCUPANCY SENSORS SENSE MOTION. MOTION SENSOR SHALL RESET EVERY TIME MOTION IS SENSED WITH A TIME-OUT OF 15 MINUTES. AFTER NO MOTION IS SENSED FOR 15 MINUTES, LIGHTS SHALL DIM TO 50%. IF NO MOTION IS SENSED FOR AN ADDITIONAL 30 MINUTES, LIGHTS SHALL BE SWITCHED OFF. IF MOTINO IS SENSED WITHIN THE 30 MINUTE TIME FRAME, THE LIGHTS SHALL GO TO FULL BRIGHTNESS AND THE SEQUENCE SHALL START OVER.

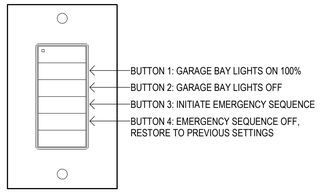
EXTERIOR LIGHTS - EXTERIOR BUILDING GENERAL LIGHTS AND PARKING LOT LIGHTS SHALL BE CONTROLLED BY A PHOTOCELL FOR ON AND OFF.

WHEN AN EMERGENCY ALERT CALL COMES IN, THE LIGHTING CONTROL SYSTEM SHALL RECEIVE AN AUTOMATED TRIGGER OR A PRE-PROGRAMMED BUTTON IN THE 4-BUTTON CONTROL STATIONS AT THE WORK DESK AND IN THE GARAGE BAY TO INITIATE THE FOLLOWING SEQUENCE:

1. THE BEDROOM LIGHTS WILL OVERRIDE ANY LOCAL CONTROL AND RAMP UP THE LIGHT LEVEL FROM 0-100% OVER THE COURSE OF 30 SECONDS. THE LIGHTS SHALL STAY AT FULL BRIGHTNESS UNTIL THE LOCAL SWITCH OVERRIDES OR 30 MINUTES HAVE LAPSED.
2. THE GARAGE BAY LIGHTS SHALL BE AUTOMATICALLY TURNED ON TO FULL BRIGHTNESS. THE LIGHTS SHALL STAY AT FULL BRIGHTNESS FOR 30 MINUTES AND THEN RETURN TO THE PREVIOUS LIGHTING CONDITION.
3. THE EXTERIOR RED LIGHTS SHALL BE TURNED ON. THESE LIGHTS SHALL REMAIN ON UNTIL MANUALLY TURNED OFF.

LIGHTING CONTROL DEVICE SCHEDULE

SYMBOL	DESCRIPTION	MANUFACTURER	CATALOG NO.
$LV	LOW VOLTAGE ON/OFF SWITCH	COOPER	WST-C
$LVD	DIMMING WALL SWITCH, RAISE/LOWER	COOPER	WST-C-3D
	OCCUPANCY SENSOR	COOPER	OCS-C-D12
P	LIGHTING CONTROL DIMMING POWER PACK	COOPER	RSP-C-010-Z1
ELT	LIGHTING CONTROL EMERGENCY DIMMING POWER PACK	COOPER	ESP-C-010-Z1
	WALL MOUNT DUAL TECHNOLOGY SENSOR	COOPER	WST-C3D

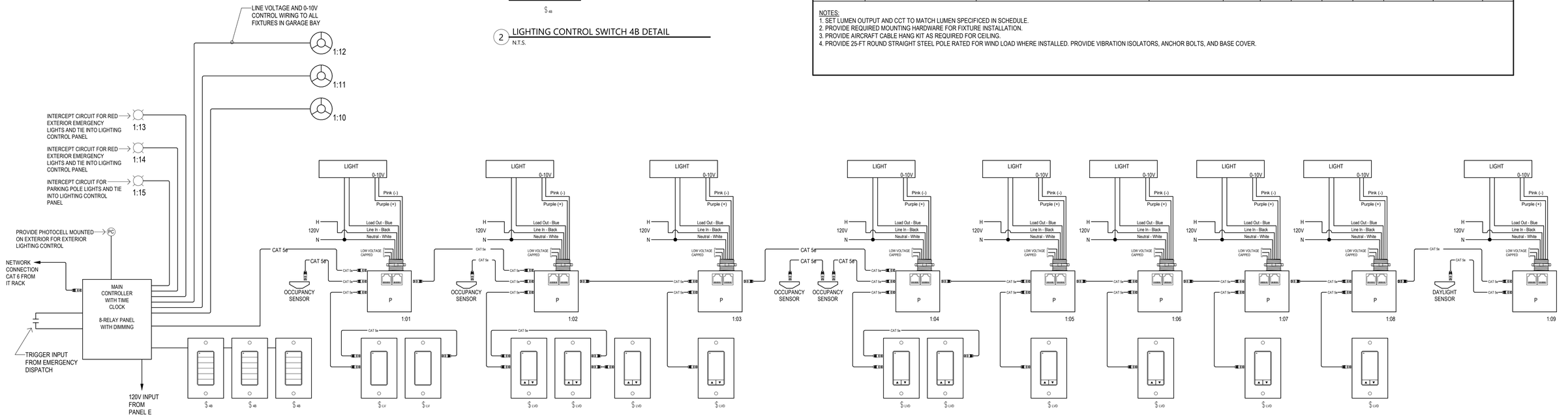


2 LIGHTING CONTROL SWITCH 4B DETAIL
N.T.S.

LIGHT FIXTURE SCHEDULE

FIXTURE TAG	DESCRIPTION	BASIS OF DESIGN MANUFACTURER/CATALOG NUMBER	APPROVED MANUFACTURERS	LUMENS	CCT	DRIVER	VOLTS	WATTS	MOUNTING	LOCATION	NOTES
A4	2X4 LED TROFFER SELECTABLE LUMENS AND CCT	METALUX 24CZSB-SCT3-UNV-PAF	LITHONIA HUBBELL PHILIPS	5276	3500K	0-10	UNV	38	RECESSED	CEILING	1
B4	2X4 LED ARCHITECTURAL WHITE FINISH	CORELITE PTR24-40S-L835-UNV-W	LITHONIA HUBBELL PHILIPS	4000	3500K	0-10	UNV	33	RECESSED	CEILING	.
D1	4" LED DOWNLIGHT, SHOWER RATED	HALO SMD4S07FS5	JUNO PRESCOLITE LIGHTOLIER	780	3500K	STD	UNV	8	SURFACE	CEILING	1
E	LED EXIT LIGHT, WHITE HOUSING, RED LED, EMERGENCY BATTERY SELF DIAGNOSTICS	SURELITES LPX7R-SF	LITHONIA DUAL LITE CHLORIDE	RED	N/A	STD	UNV	2	SURFACE	WALL/CEILING	2
F4	4-FT LED STRIP LIGHT SELECTABLE LUMENS AND CCT AIRCRAFT CABLE HANGING KIT	METALUX 4SLSTPSLC-UNV	LITHONIA HUBBELL PHILIPS	6000	4000K	0-10	UNV	46	SURFACE	CEILING	2,3
H	LED HIGH BAY LIGHT, WHITE HOUSING, SAFETY CABLE	METALUX UHBS2-1218-MV-L8C5-U-PC10/120-UHBS-SC7	LITHONIA HUBBELL PHILIPS	12,000	4000K	0-10	UNV	195	PENDANT	CEILING	1,2
AA	POLE MOUNT AREA LIGHT TYPE 3 DISTRIBUTION BRONZE FINISH	LUMARK PRV-PA2B-740-U-T3-SA-BZ-PRVSA-BZ 25-FT ROUND STRAIGHT STEEL POLE	LITHONIA HUBBELL GARDCO	19,667	4000K	STD	UNV	151	POLE	SITE	4
BB	LED FLOOD LIGHT FOR FLAG	ABOVE ALL HOFL-C42-40-1-24-KNS-BZ-1.8FT / HOFL-ADJSM-BZ	-	4,000	4000K	STD	UNV	42	STANCHION	BASE	-
CC	4" LED CYLINDER WET LOCATION BLACK FINISH	SPECTRUM CW0406PC-20L-40K-WD-EX-SO-WM-MB	-	1,100	4000K	STD	UNV	13	SURFACE	WALL	-

NOTES:
1. SET LUMEN OUTPUT AND CCT TO MATCH LUMEN SPECIFICED IN SCHEDULE.
2. PROVIDE REQUIRED MOUNTING HARDWARE FOR FIXTURE INSTALLATION.
3. PROVIDE AIRCRAFT CABLE HANG KIT AS REQUIRED FOR CEILING.
4. PROVIDE 25-FT ROUND STRAIGHT STEEL POLE RATED FOR WIND LOAD WHERE INSTALLED. PROVIDE VIBRATION ISOLATORS, ANCHOR BOLTS, AND BASE COVER.



1 LIGHTING CONTROL SCHEMATICS
N.T.S.

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DRAWN BY: KS / JB
CHECKED BY: JAB

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

LIGHT FIXTURE SCHEDULE

E7.01

PROJECT #: 2023-34

2023-34

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

FIRE ALARM WIRING LEGEND

ID	CONDUCTORS	CIRCUIT TYPE
A	2 #18 TS	ADDRESSABLE
C	2 #14	OTHER
D	2 #14	DOOR HOLDER
L	4 #14	REMOTE LED TEST SWITCH
P	2 #14	POWER CIRCUIT
R	2 #14	RELAY SWITCH
S	2 #18 TS PLENUM	SPEAKER CIRCUIT
T	2 #18 TS	REMOTE UNIT INTERFACE
V	2 #16	VISUAL CIRCUIT

NOTE:
ALL CONDUCTORS SHALL BE SOLID.

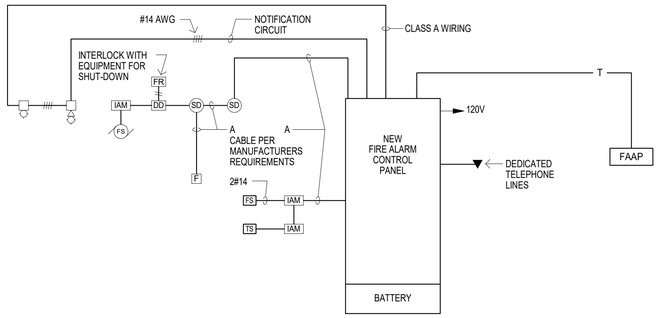
NOTES:

SYSTEM SUPPLIER SHALL PROVIDE ACCURATE WIRING DIAGRAMS ACCOUNTING FOR CIRCUIT LOADING AND VOLTAGE DROP.

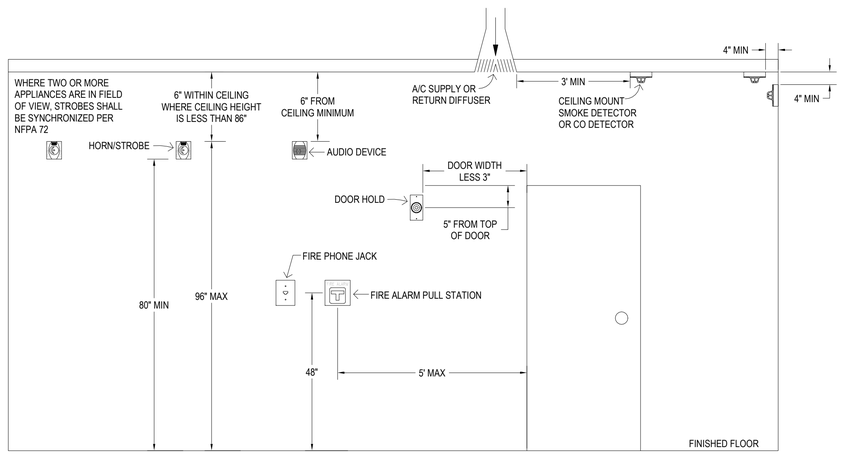
NAC PANELS ARE DIAGRAMMATIC ONLY. FIRE ALARM SUPPLIER SHALL PROVIDE QUANTITY OF NAC PANELS AS REQUIRED FOR DEVICES. PROVIDE LOAD CALCULATIONS AND BATTERY CALCULATIONS WITH SHOP DRAWINGS.

PROVIDE ALL DEVICES AND WIRING AS REQUIRED TO COMPLY WITH NFPA 72, IFC, AND LOCAL CODES.

PROVIDE ALL REQUIRED WIRING AND INTERFACE TO MONITOR FIRE/SMOKE DAMPERS. REFER TO PLAN DRAWINGS FOR LOCATIONS.

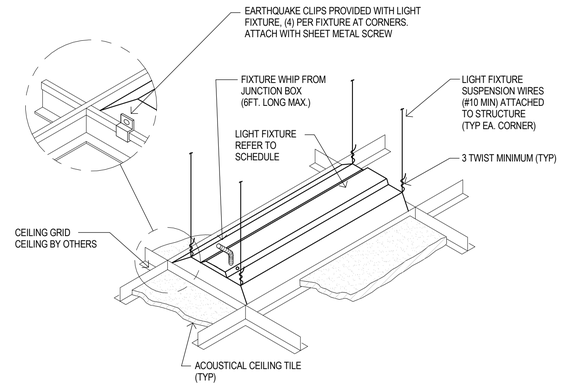


1 Fire Alarm Riser
1/8" = 1'-0"

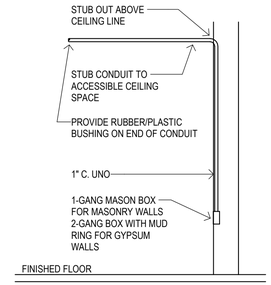


NOTE:
MOUNTING HEIGHTS ARE TYPICAL UNLESS NOTED OTHERWISE ON THE PLAN.

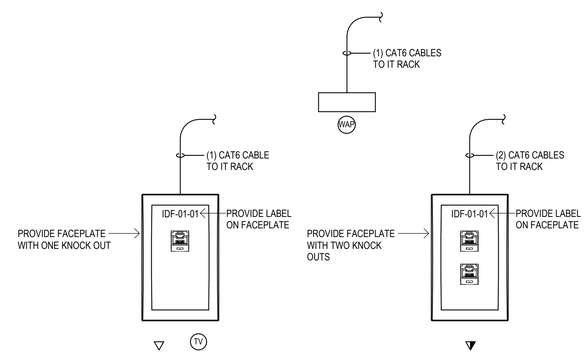
2 Fire Alarm Device Mounting Detail
1/8" = 1'-0"



3 Floor Box Detail
1/8" = 1'-0"



4 COMMUNICATION DEVICE ROUGH-IN DETAIL
N.T.S.



5 TELEVISION/DATA FACEPLATE DETAIL
N.T.S.

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DRAWN BY: KS / JB
CHECKED BY: JAB

APPROVAL DRAWINGS
JANUARY 9, 2026

DATE	REV#	REVISIONS DESCRIPTION

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

DETAILS

E8.01

PROJECT #: 2023-34

2023-34

EAST GRAND FORKS FIRE STATION NO. 2 REMODEL

East Grand Forks Fire Station No. 2 Remodel

East Grand Forks, Minnesota

Div. #	Item	Sub-Total	Divi. Total
Division 2 - Existing Conditions			
		Sub-Total	$ 32,041.31
Division 3 - Concrete			
		Sub-Total	$ 13,272.47
Division 4 - Masonry			
		Sub-Total	$ 18,656.10
Division 5 - Steel			
		Sub-Total	$ 3,000.00
Division 6 - Woods			
		Sub-Total	$ 36,850.00
Division 7 - Thermal and Moisture			
		Sub-Total	$ 223,201.10
Division 8 - Openings			
		Sub-Total	$ 51,177.09
Division 9 - Finishes			
		Sub-Total	$ 36,368.42
Division 10 - Specialties			
		Sub-Total	$ 1,755.48
Division 11 - Equipment			
		Sub-Total	$ 4,193.00
Division 12 - Furnishings			
		Sub-Total	$ 2,000.00
Division 22/23 - Mechanical			
		Sub-Total	$ 257,250.00
Division 26 - Electrical			
		Sub-Total	$ 215,522.40
Division 31 - Earthwork			
		Sub-Total	$ 5,000.00
Division 32 - Exterior Improvements			
		Sub-Total	$ 250.00

Sub-Total Construction	$	900,537.37
15% O&P	$	135,080.61
1% Performance/Payment Bond	$	10,356.18

Construction Cost	$	1,045,974.16
5% Contingency	$	52,298.71

Opinion of Probable Construction Cost $ 1,098,272.86