PROJECT MANUAL

FOR

CACHE COUNTY
SCHOOL DISTRICT

Spring Creek Middle School

Remodel & Addition

Architect's Project Number #123008

February 18, 2025

255 South 300 West
Logan, Utah 84321
435.752.7031

DESIGN WEST

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END OF SECTION 00 0110

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SECTION 00 1113
ADVERTISEMENT FOR BIDS

SEE THE ATTACHED NOTICE TO BIDDERS

END OF SECTION 00 1113

SECTION 00010 – ADVERTISEMENT FOR BIDS:

PROJECT: **Spring Creek Elementary Retrofit** for Cache County School District located at 350 West 100 North, Providence, Utah 84332.

.

DESCRIPTION: Provide lump sum bids for divisions 01 1000 through 32 3113 for Construction phase as per Architectural drawings and specifications. Phase 1 will begin June 1, 2026, and will occur through August 21, 2026. Phase 2 will begin June 7, 2027, and will occur through August 20, 2027.

TIME AND PLACE: DWA Construction, Inc. will receive contractor and supplier bids for the project at their Corporate Office located at 76 West 2400 North P.O. Box 3448, Logan, Utah 84323 on March 4, 2026 @ 3:00 PM. Faxed or emailed bids will be accepted. Please email bids to dwanate.h@dwaconstruct.com.

TYPE OF BID: The package will be awarded using a low bid best Value selection process.

PRE-BID MEETING: A pre-bid meeting will be held on February 27, 2026 @ 10:00am on site.

COMPLETION LIQUIDATED DAMAGE Liquidated damages will be assessed in the amount of $250.00 for each calendar day that the project is delayed based on the project schedule for each trade. Phase 1 will begin June 1, 2026, and be completed by August 21, 2026. Phase 2 will begin June 7, 2027, and will occur through August 20, 2027.

BIDDING DOCUMENTS: Bidding documents will be available February 18, 2026, through the office of **DWA Construction, Inc.,** 76 West 2400 North P.O. Box 3448, Logan, Utah 84323 in accordance with the Instructions to Bidders. Bidders will be limited to one (1) set of documents. These sets **WILL NOT** be available to keep for the duration of the bidding. No partial sets of documents will be issued. Plans will also be available for viewing at our website www.dwaconstruct.com and the following plan rooms:

1. Builders Exchange Plan Rooms
   Phone: 775-329-7222 utahplanroom.com

2. DWA Construction, Inc.: 76 West 2400 North Logan, Utah 84341 Phone: (435) 752-6860 Fax (435) 752-7606

3. DWA Construction Website - dwaconstruct.com under the Project Portal tab

PERFORMANCE AND PAYMENT: Upon receipt of a contract exceeding **$250,000.00**, the successful Contractor shall furnish to the Owner ***(at the CM/Owner's option)*** a 100 percent Performance and Payment Bond in accordance with the Instructions to Bidders.

BID BONDS No bid bond will be required for this project.

RIGHT TO REJECT BIDS: DWA Construction, Inc. and the Owner reserves the right to reject any or all bids and to waive any irregularities in any bid or in the bidding.

END OF SECTION

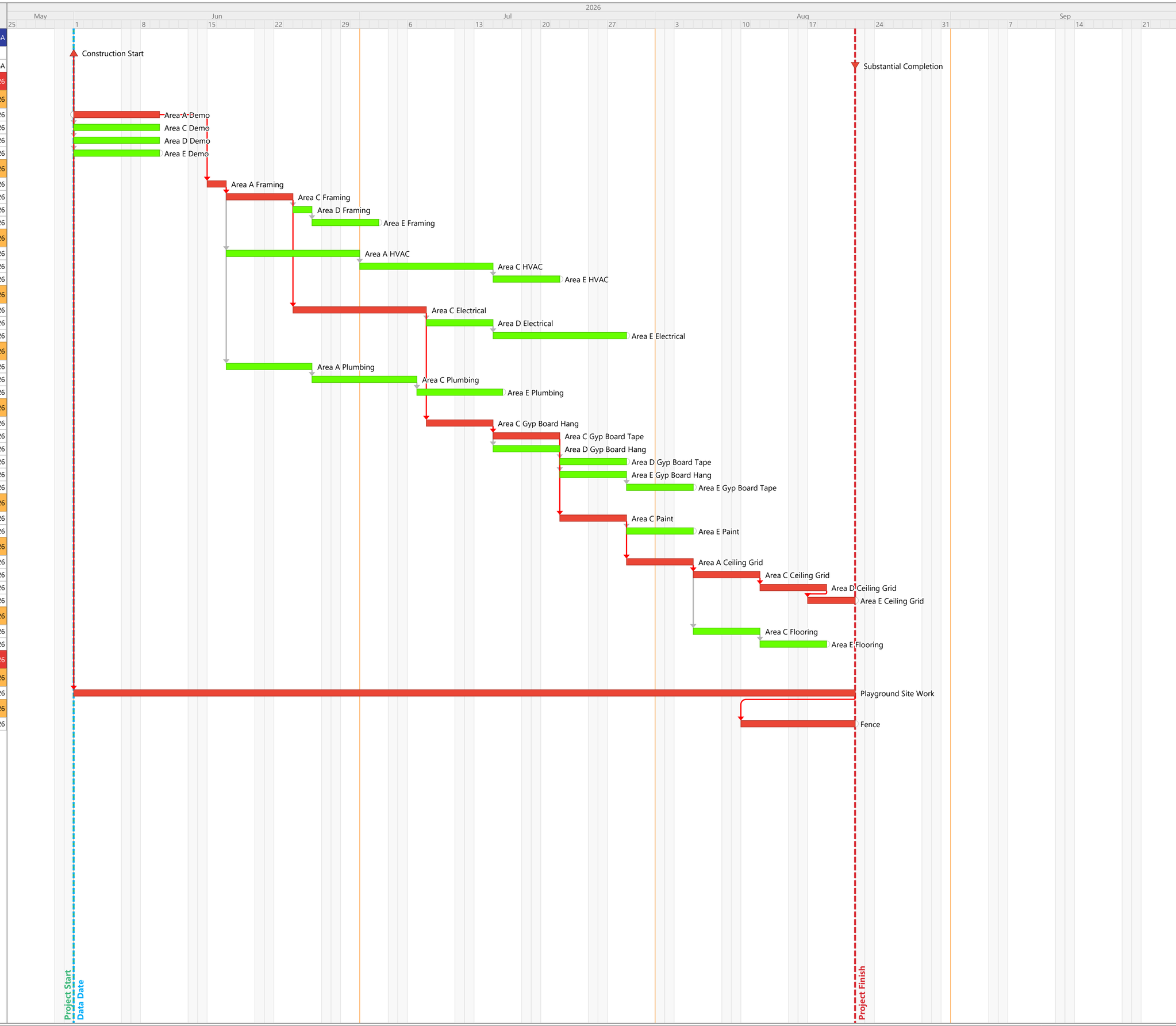
SECTION 00 0120
LIST OF SCHEDULES

1.01 FRONT END SCHEDULE

A. See the attached schedule

END OF SECTION 00 0120

ID	Description	Original Duration	Start	Finish
Spring Creek Retrofit		60	06/01/26	08/21/26A
10	Construction Start	0	06/01/26	
20	Substantial Completion	0		08/21/26A
Interior		60	06/01/26	08/21/26
Demo		7	06/01/26	06/09/26
30	Area A Demo	7	06/01/26	06/09/26
35	Area C Demo	7	06/01/26	06/09/26
37	Area D Demo	7	06/01/26	06/09/26
38	Area E Demo	7	06/01/26	06/09/26
Framing		14	06/15/26	07/02/26
40	Area A Framing	2	06/15/26	06/16/26
45	Area C Framing	5	06/17/26	06/23/26
47	Area D Framing	2	06/24/26	06/25/26
48	Area E Framing	5	06/26/26	07/02/26
HVAC		25	06/17/26	07/21/26
50	Area A HVAC	10	06/17/26	06/30/26
55	Area C HVAC	10	07/01/26	07/14/26
57	Area E HVAC	5	07/15/26	07/21/26
Electrical		25	06/24/26	07/28/26
60	Area C Electrical	10	06/24/26	07/07/26
65	Area D Electrical	5	07/08/26	07/14/26
67	Area E Electrical	10	07/15/26	07/28/26
Plumbing		21	06/17/26	07/15/26
68	Area A Plumbing	7	06/17/26	06/25/26
69	Area C Plumbing	7	06/26/26	07/06/26
72	Area E Plumbing	7	07/07/26	07/15/26
Drywall		20	07/08/26	08/04/26
90	Area C Gyp Board Hang	5	07/08/26	07/14/26
100	Area C Gyp Board Tape	5	07/15/26	07/21/26
105	Area D Gyp Board Hang	5	07/15/26	07/21/26
107	Area D Gyp Board Tape	5	07/22/26	07/28/26
108	Area E Gyp Board Hang	5	07/22/26	07/28/26
109	Area E Gyp Board Tape	5	07/29/26	08/04/26
Painting		10	07/22/26	08/04/26
80	Area C Paint	5	07/22/26	07/28/26
85	Area E Paint	5	07/29/26	08/04/26
Ceiling		18	07/29/26	08/21/26
70	Area A Ceiling Grid	5	07/29/26	08/04/26
75	Area C Ceiling Grid	5	08/05/26	08/11/26
77	Area D Ceiling Grid	5	08/12/26	08/18/26
78	Area E Ceiling Grid	5	08/17/26	08/21/26
Flooring		10	08/05/26	08/18/26
110	Area C Flooring	5	08/05/26	08/11/26
112	Area E Flooring	5	08/12/26	08/18/26
Site Work		60	06/01/26	08/21/26
Playground		60	06/01/26	08/21/26
120	Playground Site Work	60	06/01/26	08/21/26
Fencing		10	08/10/26	08/21/26
130	Fence	10	08/10/26	08/21/26



Start Date: 06/01/26
Finish Date: 08/21/26
Data Date: 06/01/26
Run Date: 02/13/26
Spring Creek Schedule 2-6.ppx

Schedule

Schedule is subject to change

DWA CONSTRUCTION INC.

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1. Builders Exchange Plan Rooms
   Phone: 775-329-7222 utahplanroom.com

2. DWA Construction, Inc.: 76 West 2400 North Logan, Utah 84341 Phone: (435) 752-6860 Fax (435) 752-7606

3. DWA Construction Website - dwaconstruct.com under the Project Portal tab

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BID BONDS No bid bond will be required for this project.

RIGHT TO REJECT BIDS: DWA Construction, Inc. and the Owner reserves the right to reject any or all bids and to waive any irregularities in any bid or in the bidding.

END OF SECTION

SECTION 00 4325
SUBSTITUTION REQUEST FORM - DURING PROCUREMENT

SEE ATTACHED DOCUMENT

END OF SECTION 00 4325

SUBSTITUTION REQUEST
(During the Bidding/Negotiating Phase)

CSI®

PROJECT: _____

SUBSTITUTION REQUEST NUMBER: _____

FROM: _____

TO: _____

DATE: _____

A/E PROJECT NUMBER: _____

RE: _____

CONTRACT FOR: _____

SPECIFICATION TITLE: _____

DESCRIPTION: _____

SECTION: _____ **PAGE:** _____

ARTICLE/PARAGRAPH: _____

PROPOSED SUBSTITUTION: _____

MANUFACTURER: _____ **ADDRESS:** _____ **PHONE:** _____

TRADE NAME: _____ **MODEL NO.:** _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.
Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

SUBMITTED BY: _____

SIGNED BY: _____

FIRM: _____

ADDRESS: _____

TELEPHONE: _____

A/E's REVIEW AND RECOMMENDATION:

☐ Approve Substitution—Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures.

☐ Approve Substitution as noted—Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures.

☐ Reject Substitution—Use specified materials.

☐ Substitution Request received too late—Use specified materials.

SIGNED BY: **DATE:**

SUPPORTING DATA ATTACHED: ☐ **Drawings** ☐ **Product Data** ☐ **Samples** ☐ **Tests** ☐ **Reports** ☐ _____

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SECTION 00 5000
CONTRACTING FORMS AND SUPPLEMENTS

PART 1 GENERAL

1.01 CMGC CONTRACTOR IS RESPONSIBLE FOR OBTAINING A VALID LICENSE TO USE ALL COPYRIGHTED DOCUMENTS SPECIFIED BUT NOT INCLUDED IN THE PROJECT MANUAL.

1.02 AGREEMENT AND CONDITIONS OF THE CONTRACT

A. The Agreement is based on AIA A101-2007.

1.03 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in Contract Documents.

B. Bond Forms:
   1. Performance and Payment Bond Form: Subcontract Performance and Payment Bond 00 6000.
   2. Labor and Material: Labor and Material PaBond 00 6000

C. Post-Award Certificates and Other Forms:
   1. Application for Payment Forms: AIA G702 with AIA G703 (for Contractors).

D. Clarification and Modification Forms:
   1. Request for Interpretation Form: None - N/A.
   2. Architect's Supplemental Instructions Form: AIA G710.
   3. Request for Proposal Form: N/A.
   4. Change Order Form: AIA G701.

E. Closeout Forms:
   1. Certificate of Substantial Completion Form: AIA G704.

1.04 REFERENCE STANDARDS

A. AIA A101-2007 - Standard Form of Agreement Between Owner and Contractor where the basis of Payment is a Stipulated Sum; 2007.

B. AIA G701 - Change Order; 2017.

C. AIA G702 - Application and Certificate for Payment; 1992.

D. AIA G703 - Continuation Sheet; 1992.

E. AIA G704 - Certificate of Substantial Completion; 2017.

F. AIA G710 - Architect's Supplemental Instructions; 2017.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 00 5000

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SECTION 00 6000
PROJECT FORMS

PROJECT FORMS

1.01 BID FORM

A. See attached document

1.02 TAX EXEMPTION CERTIFICATE FORM (TC-721G)

A. See attached document

1.03 NEW PAYMENT REQUEST

A. See attached document

1.04 CONDITIONAL WAIVER AND RELEASE UPON PROGRESS PAYMENT

A. See attached document

1.05 FINAL WAIVER AND RELEASE

A. See attached document

1.06 PURCHASE ORDER AGREEMENT

A. See attached document.

1.07 SUB-CONTRACT AGREEMENT

A. See attached document

1.08 REQUEST FOR TAXPAYER IDENTIFICATION NUMBER AND CERTIFICATION W-9 FORM

END OF SECTION 00 6000

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BID FORM
Spring Creek Elementary Retrofit

Bid form must be completed in its entirety for bid to be considered.

Subcontractor/supplier name: _____

Business Address: _____

Point of Contact: _____

Phone Number: _____

Email Address: _____

Contractor License Number: _____

BID TO: DWA Construction, Inc.
76 West 2400 North - P.O. Box 3448 - Logan, Utah 84323-3448
Phone: 435-752-6860 Fax: 435-752-7606
E-mail: dwanate.h@dwaconstruct.com

PLEASE NOTE that this project is tax exempt – DO NOT include sales tax.
If you are bidding more than one specification section,
Please attach additional breakdown information.

Acknowledge addendums: (list each separately) ___, ___, ___, ___, ___, ___, ___, ___.

Bidding Section(s):

_____

_____

Phase 1: ($_____)

Written amount: _____dollars

Phase 2: ($_____)

Written amount: _____dollars

(In case of discrepancy between the written amount and numeral, written amount will govern)

ADDITIONAL INFORMATION NEEDED:

Bid Alternate #1 – Breezeway addition: Please provide alternate pricing for this item as shown in the bidding documents. ($_____)

Written amount: _____dollars

ADDITIONAL BIDDING REQUIREMENTS:

(Failure to respond where required may result in disqualification of bid)

1. Bids shall be priced lump sum to furnish and / or install all material and / or equipment as required by plans and specifications for a complete installation.

2. The construction duration for Phase 1 will be from June 1, 2026, through August 21, 2026. The construction duration for Phase 2 will be from June 7, 2027, through August 20, 2027. Material and equipment must be delivered and installed in accordance with the Construction Manager's schedule as updated throughout the project. Liquidated damages are $250.00 per day. **See Advertisement for Bids.**

   COST OF PAYMENT AND PERFORMANCE BOND: $_____.
   Only bids over $250,000.00 will require a performance and payment bond at CM/Owner option.
   (This amount will be added to the base bid amount, if payment and performance bonds are required. If no amount is provided, it will be presumed that the bidder is unable to bond for its work on this project and may be cause for rejection).

4. The Construction Manager and Owner reserve the right to accept or reject any, and all proposals or alternates with or without cause for any reason determined to be in the owner's best interest and to waive any bidding informality or irregularity.

5. The undersigned bidder, having examined the Drawings, Specifications and related documents in their entirety, and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of labor, hereby proposes to complete the work listed above in accordance with the Contract Documents and within the time set forth, at the price stated above and upon the subcontract form included in the Specifications. The above price is to cover all expenses incurred in performing the work required under the Contract Documents.

6. CONTRACTOR'S QUALIFICATION STATEMENT: Upon request the low bidders shall submit AIA Document A305 Contractor's Qualification Statement. Failure to make a statement satisfactory to the Owner or Construction Manager will be reason to reject the bid as non-responsive. Past performance on similar projects, the demonstrated ability to complete work on schedule and ability to perform the work on this project to the satisfaction of the Owner and Construction Manager will be a priority.

BY ITS SIGNATURE, BIDDER ACKNOWLEDGES THAT THE BID DOCUMENTS ARE A COMPLETE PACKAGE. BIDDER CERTIFIES IT HAS REVIEWED ALL BID DOCUMENTS TO DETERMINE ITS TOTAL SCOPE OF WORK AND HAVE INCLUDED ALL RELATED COSTS.

Name of Bidder

X_____

Authorized Signature

X_____ Date_____

Printed name of authorized signature Contact phone number

X_____

Contractor License Number:

Utah State Tax Commission

Exemption Certificate for Governments & Schools

(Sales, Use, Tourism and Motor Vehicle Rental Tax)

TC-721G
Rev. 5/18

Name of institution claiming exemption (purchaser)			Telephone Number	
DWA Construction, Inc.			435-752-6860	
Street Address		City	State	ZIP Code
76 West 2400 North Po Box 3448		Logan	Utah	84323
Authorized Signature	Name (please print)		Title	
	Hannah Pingel		Administrative Assistant	
Name of Seller or Supplier:			Date	

The person signing this certificate MUST check the applicable box showing the basis for which the exemption is being claimed.

Email questions to **taxmaster@utah.gov.** You may also write or visit the Tax Commission at 210 N 1950 W, Salt Lake City, UT 84134, or call 801-297-2200 or toll free 1-800-662-4335.

DO NOT SEND THIS CERTIFICATE TO THE TAX COMMISSION
Keep it with your records in case of an audit.

Print Form

Clear form

☐ **UNITED STATES GOVERNMENT OR NATIVE AMERICAN TRIBE**
I certify the tangible personal property or services purchased are to be paid directly with funds from the entity noted on this form and will be used in the exercise of essential governmental or tribal functions. **NOTE:** Includes sales of tangible personal property to federally chartered credit unions. "Directly" does not include per diem, entity advances, or government reimbursements for employee credit card purchases.

☒ **CONSTRUCTION MATERIALS PURCHASED FOR SCHOOLS OR PUBLIC TRANSIT DISTRICTS**
I certify the construction materials purchased are on behalf of a public elementary or secondary school, or public transit district. I further certify the purchased construction materials will be installed or converted into real property owned by the school or public transit district.
Name of school or public transit district: Cache County School District
Name of project: Spring Creek Elementary Retrofit

☐ **FOREIGN DIPLOMAT**
I certify the purchases are authorized by a diplomatic tax exemption card issued by the United States.
Foreign diplomat number: _____

☐ **Construction Materials Purchased for Airports**
I certify the construction materials are purchased by, on behalf of, or for the benefit of Salt Lake International Airport, or a new airport owned or operated by a city in Davis, Utah, Washington or Weber County. I further certify the construction materials will be installed or converted into real property owned by and located at the airport.

☒ **UTAH LOCAL GOVERNMENTS AND PUBLIC ELEMENTARY AND SECONDARY SCHOOLS**
Sales Tax License No. 12286526-010-STC
I certify the tangible personal property or services purchased are to be paid directly with funds from the entity noted on this form and will be used in the exercise of that entity's essential functions. For construction materials, if the purchaser is a Utah local government, these construction materials will be installed or converted into real property by employees of this government entity.
CAUTION: This exemption does not apply to government or educational entities of other states and is not valid for lodging-related purchases.

☐ **UTAH STATE GOVERNMENT**
Sales Tax License No. _____
I certify the tangible personal property or services purchased are to be paid directly with funds from the entity noted on this form and will be used in the exercise of its essential functions. For construction materials, they will be installed or converted into real property by employees of this government entity.
CAUTION: This exemption does not apply to other states and is not valid for lodging-related purchases.

☐ **HEBER VALLEY HISTORIC RAILROAD**
I certify these purchases and sales are by the Heber Valley Historic Railroad Authority or its operators and are related to the operation and maintenance of the Heber Valley Historic Railroad.

IMPORTANT: To protect your privacy, use the "Clear form" button when you are finished. Clear form

To be valid this certificate must be filled in completely, including a check mark in the proper box.

A sales tax license number is required only where indicated.

Please sign, date and, if applicable, include your license or exemption number.

NOTE TO SELLER: Keep this certificate on file since it must be available for audit review.

NOTE TO PURCHASER: Keep a copy of this certificate for your records. You must notify the seller of cancellation, modification, or limitation of the exemption you have claimed.

If you need an accommodation under the Americans with Disabilities Act, email **taxada@utah.gov**, or call 801-297-3811 or TDD 801-297-2020. Please allow three working days for a response.

PAYMENT REQUEST FORM

Project Name: Spring Creek Elementary Retrofit

Invoice/Payment Application Number: _____ **Period Ending Date:** _____

STATEMENT OF CONTRACT AMOUNT:

1. Original Contract Amount $_____
2. Approved Change Orders $_____
3. Adjusted Contract Amount *(Add or Subtract line 2 from line 1)* $_____

PROGRESS BILLING:

4. Work Completed and Materials Provided on Contract to Date (____% to date) $_____
5. Less Retention (_5% to date) $_____
6. Total Work Completed and Materials Provided Less Retention *(Subtract line 5 from line 4)* $_____
7. Total Previous Application for Payments *(Line 6 from previous application)* $_____
8. **AMOUNT DUE THIS REQUEST** *(Subtract line 7 from line 6)* $_____

LABOR & MATERIALS SUPPLIED THIS MONTH:

9. Materials supplied this month $_____
10. Labor this month $_____

Supplier/Subcontractor Lien Releases (DWA provided forms) must be provided prior to distribution of payments.
Waiver & Releases attached to this payment request form? (circle one). *Yes No*
Name and Amount of Two-Party Checks required on this months draw: _____

_____

Company Name: _____
DWA Utah Conditional Waiver & Release Upon Progress Payment must be attached to this request.

By: _____
(Signature Here)

Print Name: _____
Title: _____
Date: _____

P.O. Box 3448
Logan, Utah 84323-3448
www.dwaconstruct.com
Phone: (435)752-6860
Fax: (435)752-7606

CONDITIONAL WAIVER AND RELEASE UPON PROGRESS PAYMENT

Property Name: Spring Creek Elementary Retrofit

Property Location: 350 West 100 North, Providence, Utah 84332

Undersigned's Customer: _____

Invoice/Payment Application Number: _____

Payment Amount: _____

Payment Period: _____

To the extent provided below, this document becomes effective to release and the undersigned is considered to waive any notice of lien or right under Utah Code Ann., Title 38, Chapter 1, Mechanics' Liens, or any bond right under Utah Code Ann., Title 14, Contractors Bonds, or Section 63-56-504 related to payment rights the undersigned has on the above described Property once:

1. **the undersigned endorses a check in the above referenced Payment Amount payable to the undersigned; and**
2. **the check is paid by the depository institution on which it is drawn.**

This waiver and release applies to a progress payment for the work, materials, equipment, or a combination of work, materials, and equipment furnished by the undersigned to the Property or to the Undersigned's Customer which are the subject of the invoice or Payment Application, but only to the extent of the Payment Amount.

This waiver and release does not apply to any retention withheld; any items, modifications, or changes pending approval; disputed items and claims; or items furnished or invoiced after the Payment Period.

The undersigned warrants that the undersigned either has already paid or will use the money the undersigned receives from this progress payment promptly to pay in full all the undersigned's laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or combination of work, materials, and equipment that are the subject of this waiver and release.

Dated: _____

_____

(Company Name)

By: _____

Its: _____

P.O. Box 3448
Logan, Utah 84323-3448

www.dwaconstruct.com

Phone: (435)752-6860
Fax: (435)752-7606

WAIVER AND RELEASE UPON FINAL PAYMENT

Property Name: Spring Creek Elementary Retrofit

Property Location: 350 West 100 North, Providence, Utah 84332

Undersigned's Customer: _____

Invoice/Payment Application Number: _____

Payment Amount: _____

To the extent provided below, this document becomes effective to release and the undersigned is considered to waive any notice of lien or right under Utah Code Ann., Title 38, Chapter 1, Mechanics' Liens, or any bond right under Utah Code Ann., Title 14, Contractors Bonds, or Section 63-56-504 related to payment rights the undersigned has on the above-described Property once:

1. **the undersigned endorses a check in the above referenced Payment Amount payable to the undersigned; and**
2. **the check is paid by the depository institution on which it is drawn.**

This waiver and release applies to the final payment for the work, materials, equipment, or a combination of work, materials, and equipment furnished by the undersigned to the Property or to the Undersigned's Customer.

The undersigned warrants that the undersigned either has already paid or will use the money the undersigned receives from the final payment promptly to pay in full all the undersigned's laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or combination of work, materials, and equipment that are the subject of this waiver and release.

Dated: _____

_____

(Company Name)

By: _____

Its: _____

P.O. Box 3448
Logan, Utah 84323-3448

www.dwaconstruct.com

Phone: (435)752-6860
Fax: (435)752-7606

CONSTRUCTION INC.
P.O. Box 3448 Logan, Utah 84323-3448

Purchase Order Agreement

This agreement made at Logan, State of Utah, on the 20th day of March, 2026 by and between **DWA CONSTRUCTION, INC.** P.O. BOX 3448 LOGAN, UT 84323-3448 PHONE:(435)752-6860 FAX:(435)752-7606 hereinafter referred to as the prime Contractor and **SUPPLIER NAME; STREET ADDRESS; CITY, STATE ZIP CODE; PHONE(000)000-0000 FAX: N/A,** hereinafter referred to as the Supplier.

The Supplier shall furnish all materials, fabrication labor and shop drawings required for section.

DESCRIPTION OF SECTION, FOB TO JOBSITE AS PER PLANS AND SPECIFICATIONS.

TOTAL CONTRACT AMOUNT: $0,000.00

This project is tax exempt. Addendum 00-00 acknowledged & included in price. Phase 1 completion 08-21-26, Phase 2 completion 08-20-2027

The construction project identified as SPRING CREEK ELEMENTARY RETROFIT, located at 350 WEST 100 NORTH, State of UTAH, as shown in the plans and specifications pertaining to the above, named project and any other agreements made between the General Contractor and Supplier. The General Contractor and Architect shall have final approval of the design of the furnished items.

All materials shall be delivered F.O.B. jobsite by Supplier for the total purchase order price of ***Zero thousand zero hundred dollars and 00 cents,*** $***0,000.00***.

Supplier shall be liable for all payroll taxes and related employee costs with respect to employees employed by same and shall furnish proof of worker's compensation insurance and liability insurance if requested by Prime Contractor.

_____
DWA CONSTRUCTION, INC.

_____
SUPPLIER NAME

SUBCONTRACT AGREEMENT

THIS SUBCONTRACT AGREEMENT (hereinafter Agreement), made at Logan, Utah, this 20th day of MARCH, 2026, by and between DWA CONSTRUCTION, INC., P.O. Box 3448, Logan, Utah 84323, hereinafter referred to as DWA, and SUBCONTRACTOR NAME; STREET ADDRESS; CITY, STATE, ZIP CODE; PHONE(000)000-0000 FAX: N/A, hereinafter referred to as the Subcontractor. DWA and Subcontractor agree as follows:

1. SCOPE OF WORK

a. The Project
SPRING CREEK ELEMENTARY RETROFIT
350 WEST 100 NORTH
PROVIDENCE, UTAH 84332

b. The work to be performed by the Subcontractor under the terms of this Agreement consists of completing the Work (as hereinafter defined) in a manner that all components will work as intended, and furnishing, without limitation, all labor, material, supplies, tools, implements, equipment, scaffolding, permits, fees, warranties, bonds, and taxes to complete all of the following in strict accordance with all applicable drawings, plans, specifications, and contract documents:
SECTION OR DIVISION NUMBER 00 0000 – DESCRIPTION OF SCOPE OF WORK; FURNISHED AND INSTALLED COMPLETE PER PLANS AND SPECIFICATIONS

ADDENDUMS 00-00 ACKNOWLEDGED PHASE 1 COMPLETION DATE: 08-21-26 – PHASE 2 COMPLETION DATE: 08-20-27

(All items to be performed by Subcontractor as described in sections 1.b., 1.c. and 1.d. are hereafter referenced as the "Work").

Phase 1:	$ 0,000.00
Phase 2:	$ 0,000.00
	$
TOTAL AMOUNT:	**$ 0,000.00**

PROJECT IS EXEMPT FROM UTAH SALES TAX

c. Work per Contract. The Work shall be performed and completed in strict accordance with (1) the complete plans and specifications (hereinafter, the "Plans and Specifications"), as prepared by DESIGN WEST ARCHITECTS (hereinafter, "Architect") for CACHE COUNTY SCHOOL DISTRICT (hereinafter, "Owner"); (2) DWA's prime contract with Owner; and (3) all documents referenced in DWA's prime contract with the Owner, including, without limitation, the Plans and Specifications and all addenda or authorized changes issued prior to the date of execution of this Agreement (hereafter collectively, the "Contract"). Subcontractor acknowledges receipt of a complete copy of the the Contract. No delineation of duties of the Subcontractor in this Agreement shall be utilized to avoid requirements of the Contract, including the Plans and Specifications, for the Work of Subcontractor.

d. Work Standard. All Work to be performed as set forth herein above shall be complete and shall be accomplished in accordance with the Plans and Specifications, the Contract, addenda, shop drawings, and Architect's directions. All Work shall be done in a workmanlike manner, shall be acceptable to DWA, and shall comply in every detail to the Owner's Plans and Specifications. In the event of any doubt or question arising between DWA and Subcontractor with respect to the Work, the decision of the Architect shall be conclusive and binding.

e. No Architect. Should there be no supervising architect over the Work, then the matter in question shall be determined as provided in Section 11 of this Agreement.

f. Submittals. Within 30 days after it signs this Agreement, Subcontractor shall issue by mail or email all required submittals to DWA, together with detailed information as to how the submittals comply with the Contract. No submittal shall be deemed accepted until signed in writing by DWA, and acceptance by DWA does not change or waive the requirement for Subcontractor to comply with the Contract, Plans and Specifications and other documents for which Subcontractor remains responsible. Any rejected submittal shall be corrected and replaced by Subcontractor within seven (7) calendar days of notice of the rejection.

2. PAYMENTS

a. Requests for Payment. DWA agrees to pay to the Subcontractor for the satisfactory completion of the Work the sum of Zero thousand Zero hundred dollars and 00 cents******** ($0,000.00) in monthly payments of 95% of the Work performed in any preceding month, in accordance with the Request for Payment prepared by the Subcontractor and as approved by DWA and Architect, such payments to be made only as payments are received by DWA from the Owner covering the approved portion of the Subcontractor's monthly Request for Payment ("Draws"). Receipt of payment by DWA from Owner is an absolute condition precedent to any payment to Subcontractor, and payment to Subcontractor will only be made after DWA receives payment from the Owner. DWA may in its discretion make payments in the name of Subcontractor or by joint check to any employee, supplier, or subcontractors of Subcontractor (hereinafter collectively "Subs") who have furnished materials or labor to said Subcontractor as part of the Work. The subcontractor shall credit the amounts of such payments against any amounts that DWA owes or allegedly owes to Subcontractor. Subcontractor agrees to use the attached Request for Payment (Exhibit A) in all submittals for payment, and with each submittal for payment to deliver a fully executed Lien Waiver (Exhibit B for progress payments and Exhibit C for Final Payment) for the Work completed to date in accordance with the Contract, including but not limited to Lien Waivers from all material suppliers and Subs, at all tiers. DWA may modify the form of the Request for Payment and Lien Waivers as needed in its sole discretion.

b. Documentation and Verification. DWA shall have the right to request underlying documentation to support any Request for Payment submitted by Subcontractor to DWA. Upon such request, Subcontractor shall provide the underlying documents that justify the costs set forth in the Request for Payment. DWA also has the right, and Subcontractor hereby authorizes DWA, to communicate with any Subs, suppliers and employees regarding the status of Subcontractor's accounts with respect to the Work, and Subcontractor authorizes all Subs, suppliers and employees to disclose the requested information to DWA.

c. Timing. Draw requests must be submitted and received by DWA by the 25th of each month. Payment to the Subcontractor will be made for completed, acceptable Work no later than thirty (30) days after the corresponding payment has been received by DWA from Owner.

d. No Request for Payment. In the event the Subcontractor does not submit to DWA such Request for Payment prior to the date of submission of DWA's monthly Draw to Owner, then DWA may include in its monthly Draw to the Owner for work performed during the preceding month such amount as it shall deem proper for the Work of the Subcontractor for the preceding month, and the Subcontractor agrees to accept such approved portion thereof as its regular monthly payment, as described above, subject to all other terms of this Agreement.

e. Fiduciary Duty. The Subcontractor agrees that any funds received for the performance of the Work under this Agreement shall be used exclusively for labor, materials, and equipment furnished as part of the Work, that the Subcontractor has a fiduciary responsibility with respect to these funds, and that these funds will not be diverted to satisfy obligations the Subcontractor may have under any other contracts, debts, liabilities or obligations unrelated to the Work.

f. Withheld/Offset Payments. DWA may withhold a monthly payment and/or final payment to such extent as may be necessary in the exercise of DWA's discretion to protect DWA from loss for which the Subcontractor is responsible, including but not limited to, loss resulting from defective Work or untimely Work, third party claims, failure of Subcontractor to pay employees or suppliers, incomplete Requests for Payment, failure to submit required documentation, or the filing of any payment bond claim, mechanics lien, lis pendens or related claims. If Subcontractor has unfulfilled obligations to DWA on other projects, DWA may exercise a right of offset of sums from other projects due to DWA from Subcontractor against any payment due Subcontractor for the Work.

g. Extra Work. If Subcontractor performs extra work or changes to the Work without receiving a written Change Order prior to the execution of such Work, DWA shall be under no obligation to compensate the Subcontractor for such work.

h. Final Payment and Warranty. Before final payment is made, the Subcontractor agrees to execute to DWA and/or the Owner a written final lien waiver (together with final lien waivers from all material suppliers and Subs) and/or lien releases, if necessary, and a written guarantee for its Work, agreeing to make good without cost to the Owner or DWA any and all defects due to imperfect workmanship and/or materials which may appear within the period so established in the Contract; and if no such period be stipulated in the Contract, then such guarantee shall be executed for a period of one year from date the Owner accepts the Work. The Subcontractor further agrees to execute any special guarantees as provided by the terms of the Contract, prior to final payment. DWA's payment of any sums to Subcontractor shall not constitute a waiver of any claims DWA may have against Subcontractor.

3. PROSECUTION OF WORK, DELAYS, ETC.

a. Time Is of the Essence and Conflicting Terms. DWA and the Subcontractor agree to be bound by the terms of the Contract, construction regulations, general conditions, Plans and Specifications, and any and all other contract documents, if any there be, insofar as applicable to this Agreement, and to that portion of the Work herein described to be performed by the Subcontractor. If conflicting requirements of Subcontractor exist in the Contract and this Agreement or otherwise, Subcontractor shall be bound to do the additional, greater or more costly requirements as part of the Work.

b. Schedule. DWA shall establish the Work Schedule ("Schedule") within the first month after signing this Agreement, which Schedule may be reasonably modified and refined by DWA, which shall give notice of the same to the Subcontractor. DWA is the owner of the Schedule and of all float and slack time within the Schedule.

c. Commencement. Commencement of the Work by Subcontractor is an expression by the Subcontractor that:

(1) This Agreement has been accepted in its entirety.

(2) The Subcontractor has fully reviewed and analyzed all of the Plans and Specifications, this Agreement and the Contract, and the Total Amount in paragraph 1.b. is fair, just and complete compensation for the Work.

(3) The Subcontractor is aware of any impact or interference which the site conditions, climate, construction sequence, and the work of other Subcontractors will have upon access, operations, efficiency, and related factors of the Work to be performed by the Subcontractor; and

(4) It is the Subcontractor's responsibility to identify any non-code compliant construction details, omissions and discrepancies with respect to the Work, and none have been identified.

d. Due Diligence. The Subcontractor shall prosecute its Work with due diligence so as not to delay the completion of the Project and the work of DWA or other subcontractors. In the event that the Subcontractor neglects and/or fails to supply the necessary labor and/or materials, tools, implements, equipment, etc., in the opinion of DWA to timely complete the Work or to complete the Work in accordance with the Contract, then DWA shall notify the Subcontractor in writing setting forth the deficiency and/or delinquency; and within three (3) business days after date of such written notice, if the Subcontractor fails to correct the Work or to commence and continue correction of such default or neglect with diligence and promptness, DWA shall have the right if DWA so desires to take over the Work of the Subcontractor in full, and exclude the Subcontractor from any further participation in the Work covered by this Agreement; or at DWA's option, DWA may take over such portion of the Subcontractor's Work as DWA shall deem to be in the best interest of DWA, and permit the Subcontractor to continue with the remaining portions of the Work.

e. Replacement and Costs. Whichever method DWA might elect to pursue in the preceding paragraph, in addition to any and all other remedies in this Agreement, in law and in equity, the Subcontractor agrees to release DWA, for its use only, without recourse, any materials, tools, implements, equipment, etc., on the site, belonging to or in the possession of the Subcontractor, for the benefit of DWA, in correcting or completing the Work covered in this Agreement; and DWA agrees to correct or complete the Work to best of DWA's ability and in the most economical manner available to DWA at the time. Any costs incurred by DWA in doing any such portion of the Work covered by this Agreement shall be charged against any monies due or to become due under the terms of this Agreement; and in the event the total amount due or to become due under the terms of this Agreement shall be insufficient to cover the costs accrued by DWA in completing the Work, the Subcontractor and its sureties, if any, shall be bound and liable to DWA for the difference.

f. Delays. If Subcontractor believes any delays in the Schedule are required through no fault of the Subcontractor, within seven (7) days after the event giving rise to the delay, Subcontractor must submit a written change order to DWA, specifying and detailing any basis for increased costs; and upon failure to timely submit, Subcontractor waives any right to submit or have approved the change order.

g. Delay Liability. The Subcontractor shall not be held liable for any delays arising out of acts of God, strikes, embargoes, or other causes explicitly determined by DWA to be beyond the control of the Subcontractor. Subcontractor will be responsible for liquidated damages of $250.00 per day for any delay to DWA or any other subcontractors which may be directly attributable to Subcontractor; and provided, further, that if the Subcontractor fails to meet the Schedule as determined by DWA and as it may reasonably be amended from time to time by DWA under this Agreement, DWA may withhold from the contract price due the Subcontractor under this Agreement an amount equal to $250.00 per day times the number of days after the Schedule until that portion of the Work is completed, and in such event shall apply said sum against all sums owing from DWA to Subcontractor, and Subcontractor agrees to pay any deficiency on demand. All delay charges will be deducted from the amount due Subcontractor.

h. Defects. Should the proper and accurate performance of any Work under this Agreement depend wholly or partially upon the proper workmanlike or accurate performance of any work or materials furnished by DWA or of other subcontractors on the Project, the Subcontractor agrees to use all means necessary to discover any such defects and report the same in writing to DWA before proceeding with the Work which is so dependent, and Subcontractor shall allow DWA a reasonable amount of time in which to remedy such defects; and in the event Subcontractor does not so report to DWA in writing, then it shall be assumed that the Subcontractor has fully accepted the work of others as being satisfactory, and Subcontractor shall be fully responsible thereafter for the satisfactory performance of the Work covered by this Agreement, regardless of the defective work of others.

i. Clean-up. Subcontractor will be responsible for clean-up, removal, and proper disposal of all debris from performing the Work. Failure to clean up rubbish and debris shall serve as cause for withholding further payments to Subcontractor until such time as this condition is corrected to the satisfaction of DWA. Use of the dumpster located on the Project site is under the discretion of DWA, and all charges for use will be deducted from sums due to the Subcontractor. Daily cleaning up of all tools, equipment, material, and debris is required.

j. Loss/Theft. DWA assumes no responsibility whatsoever on account of any loss or damage to tools or equipment or for materials while on the Project site prior to installation. Further, DWA assumes no responsibility whatsoever on account of loss by theft or otherwise of Subcontractor's tools or equipment while on the Project site.

k. Subs. The Subcontractor represents and warrants the following to be the sole Subs and sole suppliers:

_____

_____

No Subs or suppliers may be changed without the written consent of DWA.

l. Punchlist Items. When the Subcontractor considers that the Work is substantially complete, the Subcontractor shall prepare and submit to DWA a comprehensive list of items to be completed or corrected prior to final payment (the "Punchlist"). DWA shall have the right to supplement the Punchlist with additional items that DWA, Architect, or Owner deems reasonably necessary to complete the Project based upon DWA's, Architect's, or Owner's independent inspection of the Work. Failure to include an item on the Punchlist shall not alter the responsibility of the Subcontractor to complete all Work in accordance with the Contract.

m. Final Completion. The Subcontractor shall cause Punchlist items to be completed within the timeframe, if any, determined by the Architect or, if no timeframe is so determined, then within thirty (30) days of the Completion Date. If the Subcontractor fails to correct or promptly commences to correct the deficiencies within the time period required for the Subcontractor to do so, DWA may, upon three (3) days written notice to the Subcontractor, take over and perform some or all of the Punchlist items. DWA may deduct from the final payment the actual cost to DWA of performing or causing others to perform these Punchlist items. DWA may withhold one hundred and fifty percent (150%) or the amount determined by the Architect, whichever is greater, of the estimated cost to complete the Punchlist items until Subcontractor completes the Punchlist items in accordance with the Contract or DWA completes or causes others to complete the Punchlist items.

4. SAFETY

The Subcontractor shall perform all Work in compliance with all Federal, State, and Local Safety regulations and standards (including OSHA), DWA's Safety rules and policies, and in such a manner that will protect the Subcontractor's employees and others from injury. The Subcontractor shall require all persons, employees, workers, material men related to the performance of this Agreement to wear regulation hard hats and other required safety equipment while on the Project site. If Subcontractor's employees are found on the Project site not wearing hard hats and other required safety equipment after written notice has been previously given to comply with this provision, Subcontractor will be subject to a $25.00 per occurrence fine, which will be deducted from sums due to Subcontractor. In addition, Subcontractor agrees to pay all fines, penalties and assessments resulting from its, its employees' and its Subs' failure to comply with any of the foregoing and to indemnify and hold DWA harmless from payment of the same. If any unsafe work is being performed by others on the Project and is observed by the Subcontractor, Subcontractor shall notify DWA immediately of such.

5. SURETY BOND

The Subcontractor agrees to furnish to DWA, at the Subcontractor's expense, a surety bond guaranteeing the faithful performance, including completion, of this Agreement and the payment of all labor and material bills in connection with the execution of the Work covered by this Agreement. The bond is to be written by a surety company designated or approved by DWA, and in a form satisfactory to DWA.

6. PERMITS, LICENSES, FEES, TAXES, ETC.

The Subcontractor shall, at Subcontractor's own cost and expense, apply for and obtain all necessary permits and licenses, and Subcontractor shall conform strictly to the laws, ordinances and regulations in force in the locality where the Work on the Project is being done. The Subcontractor shall indemnify and hold DWA harmless against liability by reason of the Subcontractor having failed to pay federal, state, county, or municipal taxes or to otherwise comply with applicable laws, ordinances and regulations.

7. INSURANCE

a. The Subcontractor agrees to comply in all respects with the employment and payment of labor required by law.

b. The Subcontractor agrees to carry comprehensive public liability and property damage insurance, and such other insurance as DWA might deem necessary, in an amount as approved by DWA in order to protect the Owner, DWA and Subcontractor against loss resulting from any acts of the Subcontractor, its agents and/or employees, including but not limited to the following:

(1) Commercial General Liability policy (CGL) with limits of not less than $1,000,000 each occurrence and $2,000,000 aggregate for the Work.

(a) CGL coverage must be written on ISO occurrence form CG 00 01 10/01 or an equivalent, providing coverage for the indemnifications required in this Agreement, including but not limited to independent contractors, products-completed operations, personal injury and property damage.

(b) DWA, Owner and all other parties required of DWA, must be named as an additional insured on the CGL policy using an additional insured endorsement that provides primary, non-contributory coverage AND completed operations coverage.

(c) The Subcontractor must maintain CGL coverage for itself and all additional insureds for the duration of the Work and maintain Complete Operations coverage for itself and each additional insured for at least 3 years after completion of the Work or the length of the state's statute of repose, whichever is greater.

(2) Business Automobile Liability coverage with limits of $1,000,000 for each accident. Coverage should include liability arising out of all owned, leased, hired and non-owned automobiles.

(3) Commercial Umbrella coverage with limits of at least $2,000,000. Coverage must include all entities that are additional insured on the CGL.

(4) Workers' Compensation and Employers' Liability coverage with limits of at least $500,000 for each accident, $500,000 for bodily injury by accident, and $500,000 for each employee for injury by disease.

(5) To the fullest extent permitted by law, all policies must provide a waiver of subrogation on the CGL, Business Automobile, Workers' Compensation and Umbrella Liability policies.

(6) A copy of the additional insured endorsements and policies must be provided to DWA prior to commencement of Work or within seven (7) days of written request of DWA, whichever first occurs.

c. All insurance must provide at least thirty (30) days' written notice to DWA prior to cancellation of any insurance. All insurance must have a Best's rating of no less than A- and must be authorized to do business in the state where the Project is located.

d. If any insurance coverage, clauses or limits beyond those provided herein are required in the Contract, the Subcontractor shall provide the same.

8. ASSUMPTION OF DUTIES AND INDEMNIFICATION

a. The Subcontractor assumes toward DWA all the obligations and responsibilities that DWA assumes toward the Owner. The Subcontractor shall indemnify DWA and the Owner against, and save them harmless from, any all loss, damage, expenses, costs, and attorney's fees incurred or suffered on account of any breach this Agreement, or any conditions, provisions or covenants of the Agreement.

To the fullest extend permitted by law, Subcontractor shall indemnify, defend, and hold harmless DWA and its agents, affiliates, and employees from and against all claims, liabilities, damages, losses, and expenses, including but not limited to attorney's fees, arising out of or resulting from the performance of the Work, provided that any such claim, liability, damage, loss or expense (1) is attributable to bodily injury, sickness, disease, or death, or to injury or destruction of tangible property including the loss of use resulting therefrom, or (2) due to any failure by Subcontractor to make any payment to Subs, materials providers, or others who have provided services or materials in connection with the Work. In the event of any collection action, payment bond claim, or mechanics lien filed by a labor or materials supplier against the Project for which DWA or Owner has paid or any other claim arising under this paragraph or Agreement, DWA may either (i) tender the defense of such claims to Subcontractor or (ii) retain an attorney and defend such claims and receive reimbursement from Subcontractor for all costs and attorney fees thereby incurred, and (3) is caused by whole or in part by an act or an omission of Subcontractor, anyone directly or indirectly employed by Subcontractor, or anyone for whose acts Subcontractor may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

9. CHANGES, ADDITIONS AND DEDUCTIONS

a. DWA may add or deduct from the amount of Work covered by this Agreement; and any changes made in the amount of Work involved, or any other parts of this Agreement, shall be by a written and signed amendment hereto setting forth in detail the changes involved and the value thereof which shall be mutually agreed upon between DWA and the Subcontractor; if mutual agreement is not possible, then the value of the Work shall be determined as provided in Section 11 of this Agreement. In either event, however, the Subcontractor agrees to proceed with the Work as changed when so ordered in writing by DWA so as not to delay the progress of the Work and pending any determination of the value thereof.

b. Change orders must be broken down by material and labor with markups as indicated in the specifications.

c. The Subcontractor agrees to make no claim for additional, extra or changed work outside the scope of this Agreement, and the terms hereof shall be conclusive with respect to this Agreement unless altered in writing signed by the parties.

d. The Subcontractor agrees not to sublet, transfer or assign this Agreement or any funds due or to become due or any part thereof without the written consent of DWA.

e. Any questions, clarifications, etc. must be submitted in writing to DWA as soon as they arise.

f. Subcontractor shall not proceed with any changes or alterations to the Plans and Specifications without written approval from Architect and DWA.

g. The Subcontractor shall promptly comply with construction directives.

10. BACK CHARGES

There will absolutely be no back charges and/or extra charges by Subcontractor against DWA or Owner, without prior approval in writing signed by DWA. Otherwise, any back charges are prohibited, null and void, and shall be absorbed by the Subcontractor. Any back charges assessed to the Subcontractor by DWA will be calculated at cost plus 10%.

11. DISPUTES

In the event of any dispute between DWA and Subcontractor relating specifically to the scope of the Work, the dispute shall be resolved in the manner provided by the Contract. If none be provided, or if there arises any dispute arising from or relating to the Agreement or the Work, then such disputes shall be first submitted to mediation with a qualified mediator determined by the parties to this Agreement, and if mediation is not successful, then resolved, in DWA's sole discretion, by an arbitration panel consisting of three members, one selected by DWA, one by the Subcontractor, and the third member shall be selected by the first two members. If DWA selects arbitration, DWA and Subcontractor agree to be bound by the findings of any such panel of arbitration, finally and without recourse to any courts of law. If DWA elects to resolve the dispute through litigation, any lawsuit, action, or proceeding arising out of or relating to this Agreement shall be instituted in the federal courts of the United States of America located in the State of Utah or the state courts of the State of Utah. Each party irrevocably submits to the exclusive jurisdiction of such courts in any suit, action, or proceeding relating to or arising from the Agreement. In the event there is a dispute between DWA and Subcontractor that arises out of this Agreement or relates to the Work, and if there is a court action or arbitration as a result of such dispute, the party that prevails in such action shall be entitled to recover from the other its reasonable attorneys' fees and costs, including expert witness fees, consultant fees, and reasonable deposition costs.

12. DEFAULT AND TERMINATION OF CONTRACT

a. Default. The following events, or any one of them, shall constitute events of default by the Subcontractor:

(1) Failure to perform Work as required by the Schedule.
(2) Failure or neglect to correct Work is found to be defective by and at the reasonable discretion of DWA.

(3) Failure to supply materials which have been specified, or to supply the specified quality.
(4) Failure to supply materials of sufficient quantity.
(5) Failure to begin Work pursuant to the terms of this Agreement.
(6) Failure to supply a workforce of sufficient size or skill level.
(7) Failure to carry out and complete the Work without delay to the Project, DWA, or other subcontractors.
(8) Failure to make prompt payments for materials, labor, equipment and services provided to the Project.
(9) Failure to observe and abide by all applicable laws, ordinances, rules, regulations or orders of any public authority having jurisdiction over the Project.
(10) In the sole opinion of DWA, abandonment of the Project and the Subcontractor's Work under this Agreement.
(11) Failure to comply with the licensing laws of the state in which the Work is performed.
(12) Failure to comply with any of the terms of this Agreement.
(13) Reasonable doubt that the remaining Work of Subcontractor can be completed for the then unpaid balance to the Subcontractor.
(14) DWA in its reasonable discretion determines Subcontractor's ability to complete the Work or complete it in a timely manner is uncertain or unlikely.

b. Notice of Default. If the Subcontractor fails to perform in accordance with the terms of this Agreement, DWA may provide to Subcontractor a "Notice of Default" specifying the nature of the Subcontractor's default.

c. Remedy of Default. The Subcontractor shall have three (3) business days from the time of issuance of the Notice of Default to remedy and correct the default. However, if such default is not corrected within the terms or time limits required for performance under this Agreement, or if in the sole discretion of DWA, the Subcontractor will not be able to do so, DWA may terminate this Agreement and dismiss the Subcontractor from the Project and have the Work performed by itself or others.

(1) Termination of this Agreement by default shall not relieve the Subcontractor from obligations of warranty, quality and conformity of the Work, and any and all payments due from the Subcontractor or any other terms included in this Agreement.

(2) The Subcontractor agrees to release DWA, without recourse, any materials on the Project site belonging to the Subcontractor for the benefit of completing the Work.

d. No Waiver of Default. No waiver by DWA of any of the provisions of this Agreement shall be effective unless explicitly set forth in writing and signed by DWA. Any failure by DWA to enforce or require the strict keeping and performance of any of the terms or conditions of this Agreement:

(1) Shall not constitute a waiver of the terms or conditions of this Agreement,

(2) Shall not affect or impair such terms or conditions in any way,

(3) Shall not impair or waive the right of DWA to avail itself of such remedies as it may have for any breach or breaches of the terms or conditions of this Agreement.

e. Termination.

(1) If the Work has been stopped, abandoned or suspended for more than ninety (90) calendar days not due to the fault or neglect of the Subcontractor, or if DWA has refused or neglected to pay amounts due to the Subcontractor pursuant to this Agreement within thirty (30) calendar days after such amounts have become due, and if DWA fails to cure such default within seven (7) business days after receiving a written notice from the Subcontractor of such default, then the Subcontractor may terminate this Agreement upon giving DWA seven (7) business days' prior written notice. The Subcontractor shall have no right to terminate this Agreement or suspend services hereunder on account of a failure by the Owner to make payment to DWA for all or any portion of the Work. Upon such termination, the Subcontractor shall be entitled to recover from DWA payment for all Work satisfactorily performed and for which payment has been received by DWA from the Owner but not yet paid to the Subcontractor. In no event shall DWA be liable to the Subcontractor or to persons or entities performing any portion of the Work for or on behalf of the Subcontractor, for any special, indirect or consequential damages or losses of anticipated profits arising out of a termination by the Subcontractor pursuant to this paragraph.

(2) Should the Owner terminate its Contract with DWA, or any part which includes the Work, DWA shall so notify the Subcontractor in writing in a timely matter, and upon written notification, this Agreement shall be terminated, and the Subcontractor shall immediately stop the Work, follow DWA's instruction regarding shutdown and termination procedures, and mitigate all costs. Any termination of this Agreement pursuant to this paragraph shall be without liability to DWA.

(3) DWA may, at any time, and at its sole discretion, terminate the Subcontractor without cause and without regard to any fault or failure to perform by any party, and solely for DWA's convenience. Termination by DWA for convenience shall be by notice of termination delivered to the Subcontractor specifying the effective date thereof. In the event of DWA's termination of the Agreement for convenience, DWA shall pay to the Subcontractor the portion of the Agreement price allocable to the Work satisfactorily completed prior to the effective date of termination and for which payment has been received by DWA from the Owner. In no event shall DWA be liable to the Subcontractor or persons or entities performing any portion of the Subs' Work for or on behalf of the Subcontractor, for any special, indirect, or consequential damages or losses of anticipated profits arising out of a termination of the Agreement by DWA for convenience pursuant to this paragraph. Upon a determination that a termination of the Agreement by DWA for cause was wrongful, such termination will be deemed converted to a termination for convenience pursuant to this paragraph and the Subcontractor's remedies for wrongful termination shall be limited to the recovery of the payments permitted for a termination by DWA for convenience as set forth in this paragraph.

(4) If the Subcontractor fails to correct or to commence and satisfactorily continue correction of a default within three (3) business days after written notification, then DWA may terminate the Agreement for cause. Upon such termination, DWA may use any materials, implements, equipment, appliances, or tools furnished by or belonging to the Subcontractor to complete the Work. DWA also may furnish those materials and equipment and/or employ such workers or subcontractors as DWA deems necessary to maintain the orderly progress of the Work. All costs and expenses incurred by DWA in performing the Work and in employing others to perform the Work, including reasonable overhead, profit, and attorneys' fees, shall be deducted from any monies due or to become due the Subcontractor under this Agreement. The Subcontractor shall be liable for the payment of any amount by which such costs and expenses plus any other damages suffered by DWA as a consequence of the Subcontractor's breach of this Agreement may exceed the unpaid balance of the Agreement price.

f. Conditions Following Subcontractor Termination for Cause.

(1) Right of Retention. Upon receipt or the sending of a Notification to Terminate, or upon termination of this Agreement for cause, the Subcontractor acknowledges the right of DWA to retain:

(a) Up to 5% of the total value of all Work performed by the Subcontractor through the expiration of the warranty period, or

(b) Up to 5% of the total value of all Work performed by the Subcontractor for a period not exceeding the statute of limitations for liens, or

(c) Up to 10% of the total value of all Work performed by the Subcontractor for a period not to exceed the time allowed by law for filing wage claims by the Subcontractor's employees.

(2) If the Subcontractor is called upon to perform warranty work and the Subcontractor fails to correct such Work within the warranty terms of this Agreement, DWA may use the retained funds to pay for the correction of the defective Work.

(3) Any funds retained pursuant to this Section shall be released in full to the Subcontractor within ten business days of the expiration of the applicable retention term if all warranty Work has been performed and completed pursuant to the terms of this Agreement.

g. Suspension. DWA may, for just cause or by direction, suspend all or part of the Subcontractor's Work. DWA will give written notice to the Subcontractor stating the nature, effective date and anticipated duration of such suspension, whereupon the Subcontractor shall suspend Work to the extent specified and shall place no further orders or perform no other Work except as permitted by DWA's notice of suspension. During the period of such suspension, the Subcontractor must care for all Work, materials, and equipment at the Project site or at storage areas under the Subcontractor's responsibility. The Agreement price shall be adjusted by Change Order if the cost of the Work is increased or decreased by reason of such suspension. If additional time for completion of the Work is required as a result of such suspension, the Subcontractor shall submit a written request for additional time prior to resuming the Work. Failure to submit a written request for additional time due to such suspension shall result in no extension of time being granted.

In the event the prime contract between the Owner and DWA should be terminated prior to its completion, then DWA and Subcontractor agree that an equitable settlement for Work performed (less damages and offsets) under this Agreement prior to such termination will be made as provided by the contract documents, if such provision be made; or, if none such exist, next by mutual agreement; or failing either of these methods, by arbitration as provided in Section 11.

13. FINANCIAL POSITION

Subcontractor herewith certifies that no bankruptcy proceeding has been filed in any chapter of the United States or State Bankruptcy Acts, and further that no such bankruptcy action is intended or contemplated by said Subcontractor, or if Subcontractor has filed or files a voluntary or any creditor files against Subcontractor an involuntary petition under any facet of the Bankruptcy Act, DWA may terminate this Agreement and immediately be relieved of any further obligations except as provided in Section 11 of this Agreement. Subcontractor also authorizes DWA to regularly, as determined by DWA obtain credit and other financial reports on Subcontractor.

14. ENFORCEMENT

Upon default, the defaulting party agrees to pay all costs and attorney's fees reasonably incurred by the party not in default in enforcing the terms of this Agreement of its rights herein.

15. SEVERABILITY

If any paragraph or portion of this Agreement is found illegal or unenforceable for any reason, the rest of this Agreement shall remain in full force and effect, and the failure of one clause shall not affect any other clause or paragraph of this Agreement.

16. GOVERNING LAW

All matters arising out of or relating to this Agreement shall be governed by and construed in accordance with the laws of the State of Utah without giving effect to any choice or conflict of law provision or rule.

DWA and Subcontractor signify their understanding and agreement with the terms by signing, and that this document incorporates the full understanding and agreement between the parties.

CONTRACTOR:

DWA CONSTRUCTION, INC.

DATED: 03/20/26

By: _____

Title: PRESIDENT

SUBCONTRACTOR:

NAME OF SUBCONTRACTOR

DATED: _____

By: _____

Title: _____

Tax Id No. _____

Form **W-9**
(Rev. March 2024)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Go to *www.irs.gov/FormW9* for instructions and the latest information.

Give form to the requester. Do not send to the IRS.

Before you begin. For guidance related to the purpose of Form W-9, see *Purpose of Form*, below.

Print or type. See ***Specific Instructions*** on page 3.

1 Name of entity/individual. An entry is required. (For a sole proprietor or disregarded entity, enter the owner's name on line 1, and enter the business/disregarded entity's name on line 2.)

2 Business name/disregarded entity name, if different from above.

3a Check the appropriate box for federal tax classification of the entity/individual whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor ☐ C corporation ☐ S corporation ☐ Partnership ☐ Trust/estate

☐ LLC. Enter the tax classification (C = C corporation, S = S corporation, P = Partnership) . . . . _____

Note: Check the "LLC" box above and, in the entry space, enter the appropriate code (C, S, or P) for the tax classification of the LLC, unless it is a disregarded entity. A disregarded entity should instead check the appropriate box for the tax classification of its owner.

☐ Other (see instructions) _____

3b If on line 3a you checked "Partnership" or "Trust/estate," or checked "LLC" and entered "P" as its tax classification, and you are providing this form to a partnership, trust, or estate in which you have an ownership interest, check this box if you have any foreign partners, owners, or beneficiaries. See instructions . . . . . ☐

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from Foreign Account Tax Compliance Act (FATCA) reporting code (if any) _____

(Applies to accounts maintained outside the United States.)

5 Address (number, street, and apt. or suite no.). See instructions.

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. See also *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

☐☐☐ – ☐☐ – ☐☐☐☐

or

Employer identification number

☐☐ – ☐☐☐☐☐☐☐

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and, generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here **Signature of U.S. person** **Date**

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9*.

What's New

Line 3a has been modified to clarify how a disregarded entity completes this line. An LLC that is a disregarded entity should check the appropriate box for the tax classification of its owner. Otherwise, it should check the "LLC" box and enter its appropriate tax classification.

New line 3b has been added to this form. A flow-through entity is required to complete this line to indicate that it has direct or indirect foreign partners, owners, or beneficiaries when it provides the Form W-9 to another flow-through entity in which it has an ownership interest. This change is intended to provide a flow-through entity with information regarding the status of its indirect foreign partners, owners, or beneficiaries, so that it can satisfy any applicable reporting requirements. For example, a partnership that has any indirect foreign partners may be required to complete Schedules K-2 and K-3. See the Partnership Instructions for Schedules K-2 and K-3 (Form 1065).

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS is giving you this form because they

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SECTION 00 6325
SUBSTITUTION REQUEST FORM - DURING CONSTRUCTION

SEE ATTACHED FORM

END OF SECTION 00 6325

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SUBSTITUTION REQUEST
(After the Bidding/Negotiating Phase)

CSI®

PROJECT: _____

SUBSTITUTION REQUEST NUMBER: _____

FROM: _____

TO: _____

DATE: _____

A/E PROJECT NUMBER: _____

RE: _____

CONTRACT FOR: _____

SPECIFICATION TITLE: _____

DESCRIPTION: _____

SECTION: _____ PAGE: _____

ARTICLE/PARAGRAPH: _____

PROPOSED SUBSTITUTION: _____

MANUFACTURER: _____ ADDRESS: _____ PHONE: _____

TRADE NAME: _____ MODEL NO.: _____

INTALLER: _____ ADDRESS: _____ PHONE: _____

HISTORY: ☐ New Product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old

DIFFERENCES BETWEEN PROPOSED SUBSTITUTION AND SPECIFIED PRODUCT: _____

☐ Point-by-point comparative data attached — REQUIRED BY A/E

REASON FOR NOT PROVIDING SPECIFIED ITEM: _____

SIMILAR INSTALLATION:

PROJECT: _____ ARCHITECT: _____

ADDRESS: _____ OWNER: _____

DATE INSTALLED: _____

PROPOSED SUBSTITUTION AFFECTS OTHER PARTS OF WORK: ☐ No ☐ Yes; explain _____

SAVINGS TO OWNER FOR ACCEPTING SUBSTITUTION:

PROPOSED SUBSTITUTION CHANGES CONTRACT TIME: ☐ No ☐ Yes [Add] [Deduct] _____ days.

SUPPORTING DATA ATTACHED: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

CONTINUE ON NEXT PAGE

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SUBSTITUTION REQUEST
(After the Bidding/Negotiating Phase—Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

SUBMITTED BY: _____

SIGNED BY: _____

FIRM: _____

ADDRESS: _____

TELEPHONE: _____

☐ **Attachments**

A/E's REVIEW AND RECOMMENDATION:

☐ Approve Substitution—Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures.

☐ Approve Substitution as noted—Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures.

☐ Reject Substitution—Use specified materials.

☐ Substitution Request received too late—Use specified materials.

SIGNED BY: **DATE:**

OWNER'S REVIEW AND ACTION:

☐ Substitution approved—Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures. Prepare Change Order

☐ Substitution approved as noted—Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures. Prepare Change Order.

☐ Substitution rejected—Use specified materials.

SIGNED BY: **DATE:**

ADDITIONAL COMMENTS: ☐ **Contractor** ☐ **Subcontractor** ☐ **Supplier** ☐ **Manufacturer** ☐ **A/E**

CSI Form 13.1A (April 2022 version)

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SECTION 00 7200
GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS

1.01 THE GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS ATTACHED FOLLOWING THIS PAGE.

RELATED REQUIREMENTS

2.01 SECTION 00 7300 - SUPPLEMENTARY CONDITIONS.

2.02 SECTION 01 4216 - DEFINITIONS.

SUPPLEMENTARY CONDITIONS

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

END OF SECTION 00 7200

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SECTION 00 7300
SUPPLEMENTARY CONDITIONS

PART 1 GENERAL

1.01 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.

1.02 RELATED SECTIONS

A. Section 00 5000 - Contracting Forms and Supplements.

B. Section 01 4216 - Definitions.

1.03 REFERENCE STANDARDS

A. AIA A503 - Guide for Supplementary Conditions, including Amendments to AIA Documents A201, the 2017 Owner-Contractor Agreements, and the 2019 Owner-Construction Manager as Constructor Agreements; 2019.

1.04 MODIFICATIONS TO GENERAL CONDITIONS

A. ARTICLE 2 OWNER
   1. Delete Section 2.3.6 and substitute the following:
      a. 2.3.6 The Owner shall furnish the Contract Documents to the Contractor in digital format. If the Contractor requires paper documents, the Contractor shall be responsible for the costs of producing such paper documents.

B. ARTICLE 3 CONTRACTOR
   1. Add the following Section 3.2.5 to Section 3.2:
      a. 3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.
   2. Add the following to the end of Section 3.4.2:
      a. 3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.
   3. Delete Section 3.6 and substitute the following:
      a. 3.6 The contractor, subcontracts, and suppliers shall not include Utah State sales tax on any construction materials for this project. A tax ID # will be providced for the sole purpose of the purchase of marerial for this project only.
   4. Add Section 3.12.11 to Section 3.12:
      a. 3.12.11 The Architect's review of Contractor's submittals will be limited to examination of an initial submittal and two (2) resubmittals. The Contractor shall reimburse the Owner for amounts paid to the Architect for evaluation of additional resubmittals.

C. ARTICLE 4 ARCHITECT
   1. Add Section 4.2.2.1 to Section 4.2.2:

a. 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

2. The following language may be added as Section 4.2.7.1:
   a. 4.2.7.1 In no case will the Architect's review period on any submittal be less than ten (10) days after receipt of the submittal from the Contractor.

D. ARTICLE 7 CHANGES IN THE WORK
1. Add the following Section 7.1.4 to Section 7.1:
   a. 7.1.4 The combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:
      1) For the Contractor, for Work performed by the Contractor's own forces, 15 percent overhead and profit of the cost on all self performed work under $5,000, 10 percent on all work from $5 - 10,000, and 5 percent on all work over $10,000.
      2) For the Contractor, for Work performed by the Contractor's Subcontractors, 5 percent of the amount due the Subcontractors.
      3) For each Subcontractor involved, for Work performed by that Subcontractor's own forces, the percentages to the same as in item 1) above.
      4) For each Subcontractor involved, for Work performed by the Subcontractor's Subsubcontractors, 5 percent of the amount due the Sub-subcontractor.
      5) Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.4.
2. Add the following Section 7.1.5 to Section 7.1:
   a. 7.1.5 In order to facilitate checking of proposals for increases or decreases to the contract sum, 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 also. In no case will a change involving over $500.00 be approved without such itemization.
3. Delete Section 7.2 and substitute the following:
   a. 7.2 Change Orders
   b. 7.2.1 A Change Order is a written instrument 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.
   c. 7.2.2 Except as otherwise provided in the Contract Documents, the Contractor shall prepare the Change Order form, which may include supporting materials prepared by the Architect, for review and approval by the Owner and Architect.
   d. 7.2.3 The Owner will pay R.S. Means costs adjusted for Salt Lake City for all change orders.

E. ARTICLE 9 PAYMENTS AND COMPLETION
1. Add the following sentence to Section 9.3.1:
   a. The form of Application for Payment, duly notarized, shall be AIA Document G702™–1992, Application and Certificate for Payment, supported by AIA Document G703™–1992, Continuation Sheet.
2. Add the following Section 9.8.3.1 to Section 9.8.3:
   a. 9.8.3.1 The Architect will perform no more than three (3) inspections to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections in the amount of $250.00 or the actual cost of each follow up visit by the Architect or Engineer.
3. Add the following Section 9.10.1.1 to Section 9.10.1:

a. 9.10.1.1 The Architect will perform no more than three (3) inspections to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

F. ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

1. Add the following Section 10.2.4.1 to Section 10.2.4:

a. 10.2.4.1 When use or storage of explosives, or other hazardous materials, substances or equipment, or unusual methods, are necessary for execution of the Work, the Contractor shall give the Owner reasonable advance notice.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 00 7300

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SECTION 00 7400
SUPPLEMENTARY GENERAL CONDITIONS

PART 1 GENERAL

1.01 RELATED SECTIONS

A. 00 2113 - CMGC Supplemental Instructions to Bidders

B. 00 4100 - Bid Forms

C. 00 5200 - Sample Subcontract Agreement

D. 00 7200 - General Conditions

E. Administrative and Procedural Items: Division 1.

1.02 SUPPLEMENTARY CONDITIONS:

A. Time of Completion:

1. The General Contractor shall begin work upon notice to proceed. The work shall be completed at a later date to be determined.
2. Contractor also agrees to pay liquidated damages in accordance with Supplementary Conditions and Bid Proposal if contractors delay makes the damages applicable.

B. Liquidated Damages:

1. Time is of the essence. Should the Contractor fail to complete the work within the specified times, or within such additional time as may been allowed by extension, there shall be deducted from any monies due to the Contractor the sum of $1,000.00 per day, for each and every calendar day beyond the agreed date of substantial completion or extended completion day that the work remains uncompleted in each individual trade contract. Such sum is fixed and agreed upon by the Owner and Contractor (and his surety) as liquidated damages due the Owner by reason of the inconvenience and added costs of administration, engineering and supervision resulting from the Contractor's default, and not as a penalty.
2. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, shall in no way operate as a waiver on the part of the Owner of any of his rights under the Contract.

END OF SECTION 00 7400

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SECTION 01 1000
SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: 123008 - Spring Creek MS - 2026 Remodel

B. Owner's Name: Cache County School District.

C. Architect's Name: Design West Architects.

D. The Project consists of the construction of a new school on a vacant undeveloped site..

1.02 OWNER OCCUPANCY

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

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

C. Schedule the Work to accommodate Owner occupancy.

1.03 CONTRACTOR USE OF SITE AND PREMISES

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 1000

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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. Correlation of CMGC Contractor submittals based on changes.

1.02 RELATED REQUIREMENTS

A. Section 00 5000 - Contracting Forms and Supplements: Forms to be used.

1.03 SCHEDULE OF VALUES

A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.

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.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

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

B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.

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 and three hard-copies of each Application for Payment.

1.05 MODIFICATION PROCEDURES

A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in CMGC Contractor 's employ or subcontractors of changes to Contract Documents.

B. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to CMGC Contractor .

C. For other required changes, Architect will issue a document signed by Owner instructing CMGC 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.

D. 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 with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. CMGC Contractor shall prepare and submit a fixed price quotation within 5 days.

E. CMGC 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. Document any requested substitutions in accordance with Section 01 6000.

F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.

G. 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:
   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.

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

I. 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.

J. 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.

K. 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.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 2000

SECTION 01 2300
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of Alternates.

1.02 RELATED REQUIREMENTS

A. Document 00 2113 - Instructions to Bidders: Instructions for preparation of pricing for Alternates.

1.03 ACCEPTANCE OF ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.

B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.04 SCHEDULE OF ALTERNATES

A. Alternate No. 1 -
   1. Base Bid Item: Breezeway to remain open
   2. Alternate Item: Enclosed the breezeway, add fire separations, and patch/repair any affected existing work.

PART 2 PRODUCTS

PART 3 EXECUTION - NOT USED

END OF SECTION 01 2300

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SECTION 01 2500
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedural requirements for proposed substitutions.

1.02 DEFINITIONS

A. Substitutions: Changes from Contract Documents requirements proposed by CMGC Contractor to materials, products, assemblies, and equipment.
   1. Substitutions for Cause: Proposed due to changed Project circumstances beyond CMGC Contractor 's control.
      a. Unavailability.
      b. Regulatory changes.
   2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
      a. Substitution requests offering advantages solely to the CMGC Contractor will not be considered.

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 provide same or equivalent maintenance service and source of replacement parts, as applicable.
   4. 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.
   5. Waives claims for additional costs or time extension that may subsequently become apparent.
   6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.

B. A Substitution Request for specified installer constitutes a representation that the submitter:
   1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.

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

D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
   1. No specific form is required. CMGC Contractor 's Substitution Request documentation must include the following:
      a. Project Information:
         1) Official project name and number, and any additional required identifiers established in Contract Documents.
      b. Substitution Request Information:
         1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
         2) Indication of whether the substitution is for cause or convenience.
         3) Issue date.
         4) Description of Substitution.

5) Reason why the specified item cannot be provided.
6) Differences between proposed substitution and specified item.
7) Description of how proposed substitution affects other parts of work.

c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
1) Physical characteristics.
2) In-service performance.
3) Expected durability.
4) Visual effect.
5) Warranties.
6) Other salient features and requirements.
7) Include, as appropriate or requested, the following types of documentation:
(a) Product Data:
(b) Samples.
(c) Certificates, test, reports or similar qualification data.

d. Impact of Substitution:
1) Savings to Owner for accepting substitution.
2) Change to Contract Time due to accepting substitution.

E. 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. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than [7] days prior to time required for review and approval by Architect, in order to stay on approved bidding schedule.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

A. Architect will consider requests for substitutions only within 15 days after date of Agreement.

B. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 7 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.

C. Submit request for Substitution for Convenience are not permitted during construction.

D. Substitutions will not be considered under one or more of the following circumstances:
1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
2. Without a separate written request during the bidding period.

E. Failure to order product in a timely manner to meet project timeline requirements, does not constitute justification for a substitution. Any additional costs incurred related to obtaining the specified product in a expedited manner, as a result of this failure, will not be approved in Change Orders and are the responsibilty of the ordering party.

3.04 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 CMGC 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.

3.05 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.

3.06 CLOSEOUT ACTIVITIES

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

END OF SECTION 01 2500

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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. Site mobilization meeting.

E. Progress meetings.

F. Progress photographs.

G. Coordination drawings.

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

I. Number of copies of submittals.

J. Requests for Interpretation (RFI) procedures.

K. Submittal procedures.

1.02 GENERAL ADMINISTRATIVE REQUIREMENTS

A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

B. Make the following types of submittals to Architect:
   1. Requests for Interpretation (RFI).
   2. Requests for substitution.
   3. Shop drawings, product data, and samples.
   4. Test and inspection reports.
   5. Manufacturer's instructions and field reports.
   6. Applications for payment and change order requests.
   7. Progress schedules.
   8. Coordination drawings.
   9. Correction Punch List and Final Correction Punch List for Substantial Completion.
   10. Closeout submittals.

1.03 PROJECT COORDINATOR

A. Project Coordinator: Construction Manager.

B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.

C. During construction, coordinate use of site and facilities through the Project Coordinator.

D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 1000 - Summary.

F. Coordinate field engineering and layout work under instructions of the Project Coordinator.

G. Make the following types of submittals to Architect through the Project Coordinator:
   1. Requests for Interpretation.
   2. Requests for substitution.
   3. Shop drawings, product data, and samples.
   4. Test and inspection reports.

5. Design data.
6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Progress schedules.
9. Coordination drawings.
10. Correction Punch List and Final Correction Punch List for Substantial Completion.
11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
   1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, CMGC Contractor 's correction punchlist, and any other document any participant wishes to make part of the project record.
   2. CMGC Contractor and Architect are required to use this service.
   3. It is CMGC Contractor 's responsibility to submit documents in allowable format.
   4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
   5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
   6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
   7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

B. Submittal Service: The selected service is:
   1. Procore: www.procore.com.

C. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and CMGC Contractor participating; further training is the responsibility of the user of the service.

D. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.02 PRECONSTRUCTION MEETING

A. Project Coordinator will schedule a meeting after Notice to Proceed.

B. Attendance Required:
   1. Owner.
   2. Architect.
   3. CMGC Contractor .
   4. Invited Sub-Contractors.

C. Agenda:
   1. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
   2. Submission of initial Submittal schedule.

3. Designation of personnel representing the parties to Contract, None - N/A and <1|A/E|>.
4. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
5. Scheduling.

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

3.03 SITE MOBILIZATION MEETING

A. Project Coordinator will schedule meeting at the Project site prior to CMGC Contractor occupancy.

B. Attendance Required:
1. CMGC Contractor .
2. Architect.
3. CMGC Contractor 's superintendent.
4. Major subcontractors.

C. Agenda:
1. Use of premises by Owner and CMGC Contractor .
2. Owner's requirements.
3. Construction facilities and controls provided by Owner.
4. Temporary utilities provided by Owner.
5. Survey and building layout.
6. Security and housekeeping procedures.
7. Schedules.
8. Application for payment procedures.
9. Procedures for testing.
10. Procedures for maintaining record documents.
11. Requirements for start-up of equipment.
12. Inspection and acceptance of equipment put into service during construction period.

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

3.04 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the work at maximum weekly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required:
1. CMGC Contractor .
2. Owner.
3. Architect.
4. CMGC Contractor 's superintendent.
5. Major subcontractors.

D. 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.

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

3.05 CONSTRUCTION PROGRESS SCHEDULE

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

B. 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.

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

D. Submit updated schedule with each Application for Payment.

3.06 PROGRESS PHOTOGRAPHS

A. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.

B. Photography Type: Digital; electronic files.

C. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
   1. Delivery Medium: Via email.
   2. File Naming: Include project identification, date and time of view, and view identification.
   3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

3.07 COORDINATION DRAWINGS

A. Provide information required by Project Coordinator for preparation of coordination drawings.

B. Review drawings prior to submission to Architect.

3.08 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.
   2. A resolution to an issue which has arisen due to field conditions and affects design intent.

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 using an electronic version of the form appended to this section.
   3. Prepare using software provided by the Electronic Document Submittal Service.
   4. 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.

E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
   1. Official Project name and number, and any additional required identifiers established in Contract Documents.
   2. Owner's, Architect's, and CMGC Contractor 's names.
   3. Discrete and consecutive RFI number, and descriptive subject/title.
   4. Issue date, and requested reply date.
   5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
   6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
   7. CMGC Contractor 's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.

F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
   1. Indicate current status of every RFI. Update log promptly and on a regular basis.
   2. Note dates of when each request is made, and when a response is received.
   3. Highlight items requiring priority or expedited response.
   4. Highlight items for which a timely response has not been received to date.
   5. Identify and include improper or frivolous RFIs.

H. Review Time: Architect will respond and return RFIs to CMGC Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
   1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.

I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in CMGC Contractor 's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
   1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
   2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
   3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
   4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.09 SUBMITTAL SCHEDULE

A. Submit to Architect for review a schedule for submittals in tabular format.
   1. Format schedule to allow tracking of status of submittals throughout duration of construction.

2. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
3. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
    a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.10 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.

3.11 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.

3.12 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.

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

3.13 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
    1. After review, produce duplicates.
    2. Retained samples will not be returned to CMGC Contractor unless specifically so stated.

3.14 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
   2. Sequentially identify each item. For revised submittals use original number and a sequential combination numberical and alphabetical suffix.
   3. Identify: Project; CMGC Contractor ; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
   4. Apply CMGC 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 CMGC Contractor , or without CMGC 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. Upload submittals in electronic form to Electronic Document Submittal Service website.
   6. Schedule submittals to expedite the Project, and coordinate submission of related items.
      a. For each submittal for review, allow 15 days excluding delivery time to and from the CMGC Contractor .
      b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
   7. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
   8. Provide space for CMGC Contractor and Architect review stamps.
   9. When revised for resubmission, identify all changes made since previous submission.
   10. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
   11. Submittals not requested will be recognized, and will be returned "Not Reviewed",

B. Product Data Procedures:
   1. Submit only information required by individual specification sections.
   2. Collect required information into a single submittal.
   3. Submit concurrently with related shop drawing submittal.
   4. 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.

D. Samples Procedures:
   1. Transmit related items together as single package.
   2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

3.15 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 as Noted, Resubmission not required", or language with same legal meaning.
         1) At CMGC Contractor 's option, submit corrected item, with review notations acknowledged and incorporated.
      b. "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.

E. Architect's and consultants' actions on items submitted for information:
   1. Items for which no action was taken:
      a. "Received" - to notify the CMGC Contractor that the submittal has been received for record only.
   2. Items for which action was taken:
      a. "Reviewed" - no further action is required from CMGC Contractor .

END OF SECTION 01 3000

SECTION 01 3529
HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES

SEE ATTACHED NOTICE FROM CMGC

END OF SECTION 01 3529

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DWA Construction, Inc.

Safety and Health Policy

Effective Date
9/14/2016

DWA Safety and Health Mission Statement

We are committed to providing a healthy and safe work environment for all who work on or visit our project sites. Our most valuable asset is our employees and the employees of the companies that contract with us.

We endeavor to discover and eliminate unsafe conditions and minimize safety and health related risks by identifying hazards and developing safe work practices and promoting safety awareness. DWA Construction furnishes necessary tools and protective equipment, to its employees and provides employee training in the proper use of safety equipment and personal protective equipment. We work closely with OSHA, Workman's Compensation Fund and various safety services and training entities. We strive to protect our employees, visitors and all associated property by promoting a culture of shared responsibility. The open exchange of suggestions, ideas and concerns is encouraged.

All contractors are expected to adopt of an aggressive safety policy addressing the risks pertaining to the safety and health hazards associated with their trades. All contracted companies are expected to familiarize their employees with the DWA safety and health policy, expectations of DWA management and OSHA regulations and disciplinary actions associated with disregard to any safety or health requirement, whether addressed in the DWA safety policy, OSHA regulations or regulations imposed by the owner.

OBJECTIVE

DWA Construction, owners and management, are committed to working as a cohesive team with the company Safety Manager, Utah Occupational Safety and Health Administration (consultation and enforcement), to cultivate and maintain an attitude of safety awareness. The goal of DWA Construction is to provide a safe work environment for all who enter the work site. This is accomplished through ongoing training and encouragement to develop and use safe and effective work practices.

This policy is derived from, and at a minimum, complies with Federal OSHA and UOSHA 1910 and 1926 Standards and Rules. The Policy may also include specific requirements as a condition for employment or contract work with DWA Construction. Company management reserves the right to modify this policy at will, and without prior notification, in order to best assure the safety and wellness of all who enter the job site. Modifications may be jobsite or task specific and have no effect on other jobsites.

DWA Construction honors and complies with the rules and policies of owners, contracted companies and governing agencies that are working in partnership to complete a project. Rules and policies, or parts there of, will be enforced so long as they are at least as stringent as this policy.

The purpose and intent of this policy is to take every step necessary to help prevent an accident or illness from affecting the lives of all employees on our projects. DWA Construction is concerned with the safety and well being of our employees, contractor employees, customers and visitors as well as the prevention of wasteful, inefficient work procedures, or damage to property and equipment.

APPLICABILITY

This Safety Policy applies to anyone who enters the project property. The authorization and responsibility for enforcement has been assigned to the Safety Manager. The Superintendents are accountable for the safe actions of all employees on the project.

a. Employees of DWA Construction, regardless of their position.
b. Contract employees and contract company owners and managers.
c. Individuals representing the owner, architect, engineering firms and inspectors thereof.
d. Delivery drivers are included and are the responsibility of the appropriate contractor.
e. Visitors, whether invited or accidental

RESPONSIBILITY

1. **DWA Safety Manager**

   a. Design, implement and train all employees and supervisors on all safety and health plans and rules.

   b. Resolve, with the advice of company owners and Superintendents, all safety or health rule and violation disputes.

   c. Assist the Superintendents in training and enforcement of safety rules.

   d. Has the authority to shutdown any operation or action of an individual or contracted company. The Safety Manager also has the authority to demand the removal of any individual or company from the premises.

   e. Has the authority to impose any justifiable disciplinary action or impose any requirement for restoration of permission to work on any DWA Construction project.

   f. Will work with all supervisors to reduce safety exposure on the job site.

   g. Meet with the Project Managers and Superintendents weekly to evaluate the effectiveness of safety and health plans and programs. Awareness of changes will be the responsibility of each individual whether a direct employee or contracted employee or company.

2. **DWA Construction Superintendents and Supervisors**

   a. Oversee all aspects of the daily safety and health of all who enter a project.

   b. Watch for and correct unsafe work practices or procedures. Provide on-the-spot training when necessary. Report to the Safety Manager the need for comprehensive training on the company level. Report the apparent lack of training for contracted employees.

   c. **Enforce all DWA Construction and OSHA rules and regulations.**

   d. Report all accidents and near miss accidents to the Safety Manager.

   e. Conduct weekly onsite safety meetings and report attendance to the office.

   f. Report unsafe conditions to the Safety Manager.

   g. Report to the Safety Manager the need of additional safety equipment.

3. **Companies contracting to work with/for DWA Construction**

   a. Provide a competent supervisor of authority to oversee all aspects of the daily safety and health of their employees. The supervisor and each of their employees must be able to provide verification of safety training as required by OSHA for the task they are performing.

   b. Provide all safety equipment required for their employees to work in compliance with this policy and OSHA requirements. This equipment shall include hardhats, safety glasses, hearing protection, fall protection equipment, **ladders and other equipment needed for elevated work** and any other equipment that is required for safe work. Dust masks and appropriate training in their use will be provided by the contract employer.

   c. Provide weekly safety meetings and training for their employees. Provide verification and attendance records of these meetings when requested by the Safety Manager. Provide onsite training of employees as needed.

   d. Submit to the DWA Construction Superintendent copies of certifications as required by federal or state law or federal or state OSHA regulations. This will include equipment operators, welders, electricians and anyone who requires special training and certification, either by OSHA or state law.

e. **Employees and supervisors agree to abide by the requirements of the Superintendent or Safety Manager, whether verbal or written.**

ACKNOWLEDGEMENT of POLICY

Ignorance of any part of this policy or OSHA rules or regulations will ***not*** be accepted as a reason for noncompliance. It is the responsibility of each individual and subcontracting company to become knowledgeable with the requirements for each task performed and the requirements of each project and owner. It is the sincere desire of company management to provide clarification to any employee as required:

a. Copies of this policy may be obtained at the project office or the DWA Construction office.
b. This policy should be reviewed before contractual agreements are made. Acceptance of employment, direct or contracted, will by an assumption of agreement to comply with this policy and any DWA Construction safety rules or safety requests.
c. Training will be provided to new DWA Construction employees and ongoing jobsite training will be provided when an unsafe practice is observed. Contractors are expected to provide similar training. Repetition of similar violations by an individual or company demonstrates an unwillingness to comply with this policy which may result in disciplinary action of the individual, foreman and/or contracted company.
d. Questions will be answered by the project Superintendent or the Safety Manager
e. Presentation of and attendance at weekly safety meetings is a condition of employment for any company or employee working with, or for, Darrell W. Anderson Construction.
f. Entrance to a DWA Construction project or site will be considered an acknowledgement and agreement of compliance with this policy and all safety rules applicable to that site.
f. Access to any project or property is by permission. Violators of safety rules or policies may be denied permission to enter. Employees or contracted companies may be denied access at the will of the Superintendent or Safety Manager. Previously granted permission may be revoked without prior notice.

Anyone entering a DWA project assumes the acceptance of this policy and the enforcement of rules within. They also agree to abide by the regulations set forth in the OSHA 1910 and 1926 regulations.

REPORTING OF INJURY or PROPERTY DAMAGE ACCIDENTS

All employees and/or Superintendents are responsible for filling out a **Notice of Injury or Property Damage** report immediately after an injury occurs, even if medical treatment is not required. Notice must be made at or near the time of the injury or property damage and on the same day of the accident. Employees must report the injury to their supervisor. Contracted employees must let their supervisor know, and the supervisor must pass this information to the project Superintendent. Reporting requirements are the same for property damage as an injury accident. Use the same form for near miss accident reporting.

Remember, the investigation process is part of the safety plan of DWA. The intent of the investigation is not to seek a person in which to place blame, it is to discover the root of the cause(s) of the accident and correct this situation. If noncompliance to an OSHA or policy rule is recognized as a contributing factor, disciplinary action *may* be taken with the individual *and possibly their supervisor and/or company*. Failure to report an injury immediately (meaning at or near the time of the injury and on the same day of the injury) is a violation of this Safety Policy, OSHA regulations and Workman's Compensation Fund. Failure to report injuries may result in the denial of services offered by the Workman's Compensation Fund.

REPORTING NEAR MISS ACCIDENTS

Near miss accidents may occur for various reasons or circumstances. A hazard that had not been previously recognized may become more evident or may not be recognized before a near miss accident occurs. A work practice that may have started safely may become hazardous because of changing conditions and an accident may result. Dodging the bullet once without correcting the situation may lead to an avoidable tragedy. Future accidents resulting from similar circumstances may be avoided by the early recognition and correction gained from past experience.

Reporting of near miss accidents is important to the effectiveness of Darrell Anderson Construction safety policies and plans. By reporting a near miss accident to the Superintendent, a hazardous condition or practice may be corrected in order to prevent the reoccurrence of an incidence, reducing the potential of an injury or illness. Near miss reporting should be considered and treated as a tool in the effective utilization of the safety plan.

a. Employees reporting a near miss incident, where possible, will remain anonymous and will not face disciplinary action.
b. Reporting of unsafe work practices of other workers will help in the prevention of injury to that employee and others in the vicinity.
c. Additional training will be provided at the discretion of the supervisor or at the request of the employee.
d. When it appears to be useful for further or future review, the Notice of A Near Miss Accident may be used and provided to the Safety Manager.

BASIC SAFETY RULES

Compliance with this Safety Policy and all OSHA 1910 and 1926 is a condition of employment. Employees who refuse compliance will be removed from the property and reentry to the site may be in jeopardy. Further employment or contract employment may be suspended.

These rules are meant to assist in the clarification of the most commonly violated OSHA rules. While compliance to these rules is a condition of employment with Darrell Anderson Construction it should be understood that all OSHA or owner imposed rules will also be enforced. It is the responsibility of the employer to provide training to their employees so they will work safely and in compliance with all applicable rules and regulations.

1. Hardhats will be worn at all times while on the construction site. Also, because of hazards from other contractors who are working different schedules, employees walking to, or from, their designated work sites are required to wear a hardhat. Hardhats will be worn as per manufacturers' specifications. The shell or suspension cannot be modified. The shell must not have paint or excessive stickers which could conceal damage to the shell.

   Hardhats are required for all job tasks, in all locations of the project.

Noted exceptions to the hardhat rule:

a. Hardhats are not required while inside vehicles or equipment supplied with a Roll Over Protective Structure (ROPS). It is expected that operators and supervisors will have a hardhat with them in the vehicle so that when they exit the vehicle or cab for any reason, the hardhat can be worn.

b. Hardhat use is not required at break time, provided the employees are safely out of danger of others who are working, or from danger from falling or airborne objects, i.e. personal or company vehicles, office trailers, tool trailers and the area near tool trailers that is designated for use as break areas. However, ***employees walking between their work areas and break areas or vehicles will be disciplined for not wearing a hardhat while walking through the construction area.***

2. Safety glasses will be worn as the minimum-required eye protection when there is a hazard presented by flying or airborne objects, dust contaminates or chemical exposure. Additional eye and face protection such as face shields are required for such operations as grinding, jack hammering, utilizing compressed air or handling chemicals, acids and caustics.

3. Footwear must be suitable to the conditions of the work place and tasks performed. Boots must possess sturdy uppers and souls. If the employee is exposed to falling or rolling objects, steel toes must be worn.

4. Fall Protection Requirements

   a. When a body harness is required, all buckles and connections will be snuggly fastened.

   b. Full body harnesses and lanyards shall be worn and properly secured any time there is a fall hazard of more than six (6) feet.

   c. A full body harness will be worn and the lanyard will be properly hooked to the proper connection point in the basket anytime an employee is ***using or moving*** an articulating manlift, no matter the reason or height of the basket.

   d. Employees are not required to wear fall protection while using a scissor lift with the handrails raised and both feet on the platform. Any deviation from this rule or alteration of the equipment must be approved by the Safety Manager.

   e. Contracted companies are required to supply body harnesses for their employees and provide training on the proper use of harnesses.

   f. Lifelines or retractables will be used when installing guard rails or other fall protection devises.

g. In the event fall protection cannot be achieved by means of a harnesses, a fall protection monitor will be provided by the contractor. The monitor is not allowed to conduct any work, run errands or do anything except watch and warn workers of the proximity of the edge or fall danger. Workers are allowed to approach the edge facing forward only.

5. Clothing must provide adequate protection to the body. Shirts with at least a tee sleeve and long pants will be worn at all times. No shorts are to be worn on DWA Construction projects.

6. All personnel will be required to attend safety meetings as specified by project requirements. Subcontractors will conduct training and safety meetings applicable to the dangers of their work areas and tasks. Records of safety meetings will be made available to the Safety Manager upon request

7. Supervisors and employees are responsible for keeping their work areas clean and hazard-free. Clean up is required when a job is finished or at the end of each work day. The responsible employees and their supervisor may face disciplinary action.

8. All tools, whether company owned or personally owned by the employee, must be in good working condition. Defective tools or tools with faulty cords will not be used. Examples of defective tools include chisels with mushroomed heads, hammers with loose or split handles, guards missing on saws or grinders, electrical tools with defective cords, etc. Defective equipment will be reported to the Foreman or Superintendent who will remove it from service to be repaired or destroyed.

9. All extension cords, drop cords, and electrical tools shall be checked daily. Defective cords will be immediately removed from service until repaired. Cord coverings shall be intact and free of defects that would lessen the original insulating value. Defective ends will be replaced with an approved repair end and by a qualified person.

10. Practical jokes or "Horseplay" on the jobsite is strictly prohibited.

11. The operator of equipment will never allow a passenger to ride on or in equipment not provided with a seat and seat belts for the use of the passenger. No one is allowed to ride in the bucket, on the forks or on any attachment that was not specifically designed and manufactured the purpose of personnel transportation. Both the passenger and the operator may be subject to disciplinary action.

12. OSHA 1910.134 Safety Standards will be followed for job tasks requiring respiratory protection where there is a dust, mist or chemical hazard present. Respirators, training and an approved fit test will be provided by the employer.

13. OSHA 1926 Subpart P Safety Standards will be followed during excavation work.

a. A ladder, ramp, or other safe means of egress is needed every 50 feet.

b. Any trench more than 5 feet deep shall be sloped, benched or protected by a trench box or shored to prevent a cave-in.

c. Trenches and other open excavations are to be immediately barricaded or warning tape barriers put up. Traffic barriers must be placed to provide ample warning to motorists and equipment operators.

d. Foot bridges must be installed and provided with fall protection where necessary.

e. Excavated material must be at least 24" from the trench edge. Any loose debris, rocks and garbage must be removed from trench edges.

f. Ground water must be controlled and trench sides must be monitored for erosion.

14. OSHA 1926.1053 ladder regulations will be enforced. Basic ladder rules will be followed by all employees:

a. All ladders shall be inspected daily for broken or damaged side rails, bracing, top platform and feet.

b. Damaged ladders shall be removed from service and from the jobsite.

c. Ladders shall be used as intended by the manufacturer.

d. Extension ladders will be secured at the top platform and extended three (3) feet past the working surface.

e. A step ladder shall never be used as an extension ladder or lean against a wall. A step ladder must only be used when fully opened with braces locked.

f. An employee will never step above the second rung of a step ladder, or use the top plate of a step ladder for a step or seat.

g. The horizontal braces on the back of the ladder may never be used as a step.

h. While on an extension ladder, an employee shall never allow his belt buckle to pass outside the the plane of the side rails of the ladder.

i. While working on or climbing a ladder, employees shall always face the ladder.

j. Employees shall ascend and descend ladders using three contact points at all times.

k. Extension ladders shall be placed on flat, solid ground. Slippery conditions shall be corrected prior to standing the ladder. The proper lean is a 4 to 1 ratio. Use the feet in an appropriate manner for the conditions. The ladder is to extend 3 feet past the roof edge and be secured at the top.

15. OSHA 1926.25 Housekeeping Safety Standards will be followed:

a. It is the responsibility of each trade and employee to clean up after themselves.

b. Debris will be kept clear of doorways, stairways, passageways, and work areas.

c. Nails will be immediately pulled or bent over, eliminating puncture danger.

d. Garbage and construction debris will not be allowed to accumulate and must be properly disposed of at frequent intervals.

16. OSHA 1926 Subpart L Safety Standards for scaffolding will be enforced

a. Scaffold sections shall be set level and plumb.

b. Planks will be aluminum or manufactured wood planks to conform with OSHA regulations.

c. Dimensional building lumber ***will not be used***.

d. Scaffold set on uneven ground will set on mud sills and adjustable feet.

e. Fall protection is required when working more than 6 feet above the ground. Personal fall protection is not required if a guardrail system is in place.

f. Barricades will be provided for the protection of ground personnel.

g. Planks will extend to the full width of the scaffold.

h. Snow, ice, mud, grease will be promptly removed. Scaffold walkways will be free of tools, hoses, equipment and materials.

i. Scaffolds will be placed on solid, even ground. Never set scaffolding on blocks, rocks, boxes or any other loose material which may roll or slide.

17. Radios and electronic devises are allowed on DWA Construction projects so long as it does not distract the employee or disrupt normal conversation. The volume on radios must be low enough to permit conversation and enable the worker to hear verbal warnings of danger.

18. Firearms are not allowed on any project. Firearms may be stored out of sight in personal vehicles that remain locked.

DISCIPLANARY ACTION POLICY

Any employee or visitor on a DWA Construction project is subject to this Disciplinary Action Policy, regardless of position or title.

Safety violation notice(s) shall be issued to any employee, contractor employee, or anyone on the jobsite violating the safety rules or regulations. The individual's immediate supervisor may be subject the same violation and disciplinary action as the employee.

1. Any violation of safety rules can result in suspension or immediate termination.

2. Any employee of DWA Construction receiving three written safety violations within a six month period shall be terminated. Contract employees, who demonstrate a disregard for the DWA Construction safety policy will be placed on probation, or terminated.

3. An employee or entire company may be removed from the property at the discretion of the Safety Manager or the project superintendent.

   a. A meeting may be arranged at the discretion and convenience of the Safety Manager or designee to discuss the violator's plan for compliance. Reentry will be permitted only after the Safety Manager or a designee has reviewed and approved the plan for corrective action. ***At the discretion*** of the Safety Manager or designee, the violator will be granted permission to resume work. Should the violation reoccur, the violator will be removed and permission to return under any condition may be jeopardized.

   b. Companies or employees in violation because of insufficient or unacceptable safety equipment will not be allowed to resume the task until acceptable equipment is obtained.

   c. The employment status of employees removed from the property will be determined by ***their*** employer.

   d. Offenders of this policy, or violation of any OSHA regulation while on a project property, may lose the privilege of employment with DWA Construction.

   e. Habitual offenders may be escorted off the property without prior warning.

   f. Supervisors for DWA Construction and supervisors for contracted companies may face disciplinary action as the result of a safety or health violation by their subordinates.

Rules which will result in immediate termination.

1. Fighting, show of physical aggression or verbal abuse.
2. Drug or alcohol use or possession of drugs or alcohol.
3. Refusal to submit to a drug test.

******It should be understood that DWA Construction Inc. is not restricting itself to the above rules. Additional rules as dictated by the project or job task may be demanded by the DWA Construction Safety Manager to assure the safety of all employees on the jobsite.***

DWA Construction, Inc

Safety Policy Acknowledgement

Policy effective September 14, 2016

I, _____ (please print full name) hereby acknowledge that I have received, read and understand the DWA Construction safety policy. I have been given the opportunity to ask questions regarding this safety policy. I have also read and understand the disciplinary actions that may be imposed upon me for violating any of the rules or regulations.

I agree to comply with all safety requirements of DWA Construction, OSHA requirements or safety or health requirements imposed by the owner of the property on which I am working. I also agree to comply with requirements of safety procedures not addressed in this policy, or requirements of my immediate supervisor or any member of DWA management.

I understand that I am encouraged to discuss with the safety manager, my supervisor or any member of management, safety procedures or requirements that are unclear or I do not understand. I further acknowledge that this company respects my opinions and suggestions I may have to help ensure the safety of myself, other employees of this company or any workers contracted to perform work for DWA Construction and the property of any company or individual on the jobsite.

I understand it is my personal responsibility to stay informed of any changes in safety procedures or requirements imposed by varying jobsite conditions or work tasks. I will discuss with my supervisor any concerns or conditions which may endanger myself, other workers or property.

I acknowledge any disciplinary action taken against me will become a part of my permanent record and that repetitive violations may result in my dismissal.

Employee signature: _____ Date: _____

Presented by: _____

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SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. Quality assurance.

C. References and standards.

D. Testing and inspection agencies and services.

E. Control of installation.

F. Mock-ups.

G. Tolerances.

H. Manufacturers' field services.

I. Defect Assessment.

1.02 RELATED REQUIREMENTS

A. Section 01 2100 - Allowances: Allowance for payment of testing services.

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

C. Section 01 4216 - Definitions.

1.03 REFERENCE STANDARDS

A. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2024.

B. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2023.

C. 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; 2023.

D. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2023.

E. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2021.

F. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2021.

1.04 SUBMITTALS

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

B. Design Data: Submit 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. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to CMGC 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.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and CMGC 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.

E. 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.

F. 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 QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
2. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.

1.06 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. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. 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.

1.07 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Owner will employ services of an independent testing agency to perform certain specified testing and inspection; payment for cost of services will be derived from allowance specified in Section 01 2100; see Section 01 2100 and applicable sections for description of services included in allowance.

B. Owner will employ and pay for services of an independent testing agency to perform other specified testing.

C. CMGC Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

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

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

F. CMGC Contractor Employed Agency:
   1. Laboratory: Authorized to operate in Utah.
   2. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
   3. 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 MOCK-UPS

A. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.

B. Notify Architectand None - N/A Consultant fifteen (15) working days in advance of dates and times when mock-ups will be constructed.

C. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.

D. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

E. Architect will use accepted mock-ups as a comparison standard for the remaining Work.

F. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.03 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.

3.04 TESTING AND INSPECTION

A. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Architect and CMGC Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Perform additional tests and inspections required by Architect.
   5. Submit reports of all tests/inspections specified.

B. 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 CMGC Contractor .
   4. Agency has no authority to stop the Work.

C. CMGC 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 CMGC Contractor beyond specified requirements.
   6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by CMGC Contractor beyond specified requirements.

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

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

3.05 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.

3.06 DEFECT ASSESSMENT

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

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

END OF SECTION 01 4000

SECTION 01 4216
DEFINITIONS

PART 1 GENERAL

1.01 SUMMARY

A. This section supplements the definitions contained in the General Conditions.

B. Other definitions are included in individual specification sections.

1.02 DEFINITIONS

A. Furnish: To supply, deliver, unload, and inspect for damage.

B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.

C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.

D. Project Manual: The book-sized volume that includes the procurement requirements (if any), the contracting requirements, and the specifications.

E. Provide: To furnish and install.

F. Supply: Same as Furnish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 4216

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SECTION 01 4219
REFERENCE STANDARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements relating to referenced standards.

B. Reference standards full title and edition date.

1.02 QUALITY ASSURANCE

A. For products or 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. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.

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

PART 2 CONSTRUCTION INDUSTRY ORGANIZATION DOCUMENTS

2.01 AASHTO -- AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS

2.02 ACI -- AMERICAN CONCRETE INSTITUTE INTERNATIONAL

2.03 AISC -- AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.

2.04 ANSI -- AMERICAN NATIONAL STANDARDS INSTITUTE

2.05 ASTM A SERIES -- ASTM INTERNATIONAL

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

2.06 ASTM B SERIES -- ASTM INTERNATIONAL

2.07 ASTM C SERIES -- ASTM INTERNATIONAL

2.08 ASTM D SERIES -- ASTM INTERNATIONAL

A. ASTM D1227 - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing; 2013.

2.09 ASTM E SERIES -- ASTM INTERNATIONAL

A. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

2.10 ASTM F SERIES -- ASTM INTERNATIONAL

2.11 ASTM G SERIES -- ASTM INTERNATIONAL

2.12 AWS -- AMERICAN WELDING SOCIETY

2.13 BHMA -- BUILDERS HARDWARE MANUFACTURERS ASSOCIATION

2.14 CRSI -- CONCRETE REINFORCING STEEL INSTITUTE

2.15 FM -- FACTORY MUTUAL GLOBAL

2.16 GA -- GYPSUM ASSOCIATION

A. GA-201 - Using Gypsum Board for Walls & Ceilings; 1990.

B. GA-214 - Levels of Finish for Gypsum Panel Products; 2021.

2.17 GANA -- GLASS ASSOCIATION OF NORTH AMERICA

A. GANA (GM) - GANA Glazing Manual; 2022.

B. GANA (SM) - GANA Sealant Manual; 2008.

2.18 ICC -- INTERNATIONAL CODE COUNCIL, INC.

A. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. ICC (IECC) - International Energy Conservation Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. ICC (IFC) - International Fire Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. ICC (IMC) - International Mechanical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. ICC (IPC) - International Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

2.19 ITS -- INTERTEK TESTING SERVICES NA, INC.

2.20 MFMA -- MAPLE FLOORING MANUFACTURERS ASSOCIATION

2.21 NAAMM -- THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS

2.22 NFPA -- NATIONAL FIRE PROTECTION ASSOCIATION

A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023, with Errata.

2.23 NFRC -- NATIONAL FENESTRATION RATING COUNCIL, INC.

A. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2023.

B. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.

C. NFRC (CPD) - Certified Product Directory - National Fenestration Rating Council; Current Edition.

2.24 PCI -- PRECAST/PRESTRESSED CONCRETE INSTITUTE

2.25 RCSC -- RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS

2.26 SDI -- STEEL DECK INSTITUTE

2.27 SMACNA -- SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC.

2.28 SSPC -- SOCIETY FOR PROTECTIVE COATINGS

2.29 TCNA -- TILE COUNCIL OF NORTH AMERICA, INC.

2.30 TMS -- THE MASONRY SOCIETY

A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

2.31 TPI -- TURFGRASS PRODUCERS INTERNATIONAL

A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding; 2006.

2.32 UL -- UNDERWRITERS LABORATORIES INC.

PART 3 UNITED STATES GOVERNMENT AND RELATED AGENCIES DOCUMENTS

3.01 COE -- CORPS OF ENGINEERS, U.S. ARMY

END OF SECTION 01 4219

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary telecommunications services.

C. Temporary sanitary facilities.

D. Temporary Controls: Barriers, enclosures, and fencing.

E. Security requirements.

F. Waste removal facilities and services.

G. Project identification sign.

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. Provide and pay for all electrical power, lighting, and water required for construction purposes.

C. Existing facilities with power at the scoreboard be used.

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

1.03 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

1.04 TEMPORARY SANITARY FACILITIES

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

B. Use of existing facilitieslocated at the job site is not permitted.

C. Maintain daily in clean and sanitary condition.

1.05 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 and for public access to existing building.

C. Provide protection for plants designated to remain. Replace damaged plants.

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

E. Traffic Controls: Provide during regular school hours and other school events.

1.06 FENCING

A. Construction: CMGC Contractor 's option.

B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.07 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections,

and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.08 INTERIOR ENCLOSURES

A. Provide temporary partitions and ceilings 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:

1.09 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.10 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.

C. Provide means of removing mud from vehicle wheels before entering streets.

D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.11 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.

1.12 PROJECT IDENTIFICATION

A. Provide project identification sign of design and construction indicated on drawings.

B. Erect on site at location indicated.

C. No other signs are allowed without Owner permission except those required by law.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 5000

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.

D. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

E. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.03 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of Notice to Proceed.
   2. For products specified only by reference standards, list applicable reference standards.

B. 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.

C. 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.

D. 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 CMGC Contractor ; remove from site.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Use of products having any of the following characteristics is not permitted:
   1. Containing lead, cadmium, or asbestos.

C. Where other criteria are met, CMGC Contractor shall give preference to products that:
   1. If used on interior, have lower emissions, as defined in Section 01 6116.
   2. If wet-applied, have lower VOC content, as defined in Section 01 6116.
   3. Are extracted, harvested, and/or manufactured closer to the location of the project.
   4. Have longer documented life span under normal use.
   5. Result in less construction waste. See Section 01 7419

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, substitutions allowed as per each individual section upon approval during bidding process. Contactors may bid on approved manufacturer's products or substitutions approved during bidding; those that are approved in an addendum.

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 and place in location as directed; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

A. See Section 01 2500 - Substitution Procedures.

3.02 OWNER-SUPPLIED PRODUCTS

A. Owner's Responsibilities:
   1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to CMGC Contractor .
   2. Arrange and pay for product delivery to site.
   3. On delivery, inspect products jointly with CMGC Contractor .
   4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   5. Arrange for manufacturers' warranties, inspections, and service.

B. CMGC 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. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. 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 01 6000

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SECTION 01 6116
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for Indoor-Emissions-Restricted products.

B. Requirements for VOC-Content-Restricted products.

1.02 RELATED REQUIREMENTS

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

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

1.03 DEFINITIONS

A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings applied on site.
   2. Interior adhesives and sealants applied on site, including flooring adhesives.
   3. Flooring.
   4. Composite wood.
   5. Products making up wall and ceiling assemblies.
   6. Thermal and acoustical insulation.

B. Interior of Building: Anywhere inside the exterior weather barrier.

C. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

D. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

E. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
   1. Concrete.
   2. Clay brick.
   3. Metals that are plated, anodized, or powder-coated.
   4. Glass.
   5. Ceramics.
   6. Solid wood flooring that is unfinished and untreated.

1.04 REFERENCE STANDARDS

1.05 <u>UTAH ADMINISTRATIVE CODE</u> - R307 ENVIROMENTAL QUALITY, AIR QUALITY; RULE R307-357. CONSUMER PRODUCTS.

1.06 SUBMITTALS

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

B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

PART 2 PRODUCTS

2.01 MATERIALS

A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by CMGC Contractor .

END OF SECTION 01 6116

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, None - N/A.

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 CMGC 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 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.

C. Section 01 5000 - Temporary Facilities and Controls: Temporary interior partitions.

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

E. Section 02 4100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.

F. Section 07 8400 - Firestopping.

G. Individual Product Specification Sections:
   1. Advance notification to other sections of openings required in work of those sections.

1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.04 SUBMITTALS

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

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
   3. Submit surveys and survey logs for the project record.

C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.

D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 QUALIFICATIONS

A. For surveying work, employ a land surveyor registered in Utah 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,

1.06 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.

G. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
   1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
   2. Indoors: Limit conduct of especially noisy interior work to the hours of 6 pm to 7 am.

H. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.07 COORDINATION

A. See Section 01 1000 for occupancy-related requirements.

B. 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.

C. Notify affected utility companies and comply with their requirements.

D. 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.

E. 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.

F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of work of separate sections.

H. 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. CMGC Contractor shall locate and protect survey control and reference points.

D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

E. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

G. Utilize recognized engineering survey practices.

H. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Grid or axis for structures.
   2. Building foundation, column locations, ground floor elevations.

I. Periodically verify layouts by same means.

J. 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.

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.
   4. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.

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 skilled and experienced 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. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.

G. 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.

H. 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. Notify Architect and Owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable CMGC Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

G. 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.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.12 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.13 FINAL CLEANING

A. Use cleaning materials that are nonhazardous.

B. 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.

C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Replace filters of operating equipment.

F. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.

G. Clean site; sweep paved areas, rake clean landscaped surfaces.

H. 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 observation to determine items to be listed for completion or correction in the CMGC Contractor 's Correction Punch List for CMGC Contractor 's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion observation.

D. Conduct Substantial Completion observation and create Final Correction Punch List containing Architect's and CMGC Contractor 's comprehensive list of items identified to be completed or corrected and submit to Architect.

E. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

F. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final observation.

G. 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 01 7000

SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project record documents.

B. Operation and maintenance data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 00 4000 05.1 Sub Bonds: 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. Submit an electronic copy of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. 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.
   4. Submit 1 electronic copy and 3 hard 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. Addenda.
   3. Change Orders and other modifications to the Contract.
   4. Reviewed shop drawings, product data, and samples.
   5. 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. Record Drawingsand Shop Drawings: Legibly mark each item to record actual construction including:
   1. Field changes of dimension and detail.
   2. 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:

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. 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. 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.

D. 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.

E. Provide servicing and lubrication schedule, and list of lubricants required.

F. Include manufacturer's printed operation and maintenance instructions.

G. Include sequence of operation by controls manufacturer.

H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

I. 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. 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.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, CMGC Contractor and subcontractors, with names of responsible parties.

F. 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.

G. 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.

H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.

I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

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. Owner to determine the method of submittal delivery; manual in a commercial quality binder, submitted digitally or a combination of both.

F. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION 01 7800

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SECTION 02 4100
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building demolition excluding removal of hazardous materials and toxic substances.

B. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on CMGC Contractor 's use of site and premises.

B. Section 01 1000 - Summary: Description of items to be salvaged or removed for re-use by CMGC 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 01 7419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

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.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 DEMOLITION

A. Remove other items indicated, for salvage, relocation, and recycling.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with requirements in Section 01 7000.

B. 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.

C. Do not begin removal until receipt of notification to proceed from Owner.

D. Do not begin removal until built elements to be salvaged or relocated have been removed.

E. Do not begin removal until vegetation to be relocated has been removed and vegetation to remain has been protected from damage.

F. 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.

G. 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.

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 a 7 day 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. 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. Remove materials not to be reused on site; comply with requirements of Section 01 7419 - Waste Management.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 02 4100

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SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form stripping.

1.02 RELATED REQUIREMENTS

A. Section 03 2000 - Concrete Reinforcing.

B. Section 04 2000 - Unit Masonry: Reinforcement for masonry.

C. Section 05 1200 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.

D. Section 05 2100 - Steel Joist Framing: Placement of embedded steel anchors, plates and joist seats in cast-in-place concrete.

E. Section 05 3100 - Steel Decking: Placement of steel anchors in composite decking.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.

C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI SPEC-301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

3.03 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

3.05 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION 03 1000

SECTION 03 2000
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 03 1119 - Insulating Concrete Forming

B. Section 03 3000 - Cast-in-Place Concrete.

C. Section 03 4500 - Precast Architectural Concrete: Reinforcement for precast concrete panels.

D. Section 04 2000 - Unit Masonry: Reinforcement for masonry.

E. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).

A. ACI MNL-66 - ACI Detailing Manual; 2020.

A. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

1.03 REFERENCE STANDARDS

A. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.

B. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.

C. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars; 2021.

D. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars; 2018, with Amendment (2020).

E. CRSI (DA4) - Manual of Standard Practice; 2023.

1.04 SUBMITTALS

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

B. Shop Drawings: Comply with requirements of ACI MNL-66 Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI SPEC-301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Deformed billet-steel bars.
   2. Unfinished.

B. Steel Welded Wire Reinforcement (WWR): Plain type; ASTM A1064/A1064M.

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 components for placement within 1-1/2 inches of weathering surfaces.

2.02 RE-BAR SPLICING:

1. Comply with ACI CODE-318 steel reinforcing design strength requirements for splices in tension and compression.

B. Coupler Systems: Mechanical devices for splicing reinforcing bars.

1. Comply with ACI CODE-318 steel reinforcing design strength requirements for splices in tension and compression.

C. Dowel Bar Splicer with Dowel-Ins: Mechanical devices for splicing reinforcing bars.

D. Taper Tie Hole Plug: Mechanical device for plugging tie holes; anchors optional flush or recessed grout.

E. Grout: Cementitious, non-metallic, non-shrink grout for use with manufacturer's grout sleeve reinforcing bar coupler system.

2.03 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

B. Welding of reinforcement is permitted only with the specific approval of Engineer and notification to the Architect. Perform welding in accordance with AWS D1.4/D1.4M.

C. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D3963/D3963M.

D. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Maintain concrete cover around reinforcing as noted on structural drawings.

E. Comply with applicable code for concrete cover over reinforcement.

3.02 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 01 4000 - Quality Requirements, will inspect installed reinforcement for compliance with contract documents before concrete placement.

3.03 SCHEDULES

A. Reinforcement For Superstructure Framing Members: Deformed bars, unfinished.

B. Reinforcement For Foundation Wall Framing Members, Slab-on-Grade, and Insulating Concrete Forming Walls: Deformed bars and welded wire reinforcement, galvanized finish.

END OF SECTION 03 2000

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal and replacement of existing concrete

B. Floors and slabs on grade.
   1. Including: Monolithically poured seamless concrete slab (no sawcuts, control, or expansion joints)

C. Concrete shear walls, foundation walls, and retaining walls.

D. Concrete reinforcement.

E. Track curbing

F. Runways and walk ways

G. Concrete curing.

H. Excavation, gravel, and backfill

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).

A. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.

A. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

A. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

A. ACI PRC-308 - Guide to External Curing of Concrete; 2016.

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.

C. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2023.

D. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2023.

E. ASTM C857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures; 2019.

F. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures; 2019.

G. ASTM C891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures; 2020.

H. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2023.

I. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

J. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2023.

K. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2023, with Editorial Revision.

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.
   3. Indicate proposed mix design complies with fiber reinforcing manufacturer's written recommendations.

C. Samples for Pigment Color Selection: Submit manufacturer's complete sample chip set, including pigment number and required dosage rate for each color.

D. Test Reports: Submit report for each test or series of tests specified.

PART 2 PRODUCTS

2.01 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Type: Deformed billet-steel bars.

2.02 CONCRETE MATERIALS

A. Fine Aggregate: ASTM C33/C33M.
   1. Acquire aggregates for entire project from same source.
   2. Natural sand, manufactured sand, or combination thereof, washed and screened, consisting of hard durable uncoated particles free of deleterious matter and shall be so graded from course to fine as to produce minimum percentage of voids.
   3. Test fine aggregate for reactivity in presence of cement alkalis in accordance with ASTM C289

B. Course Aggregate: ASTM C33/C33M.
   1. Acquire aggregates for entire project from same source.
   2. Normal Weight Aggregate: ASTM C33/C33M, gravel or crushed stone suitably washed and screened, and shall consist of hard, durable particles without adherent coatings.
   3. Lightweight Aggregate: ASTM C330/C330M, suitably processed, washed and screened, and shall consist of durable particles without adherent coatings.

C. Fly Ash: ASTM C618, Class C or F.

D. Precast Concrete Catch Basins: ASTM C858 precast reinforced concrete, designed according to ASTM C857 for structural loading.

2.03 ADMIXTURES

A. Chemical Admixture: ASTM C260/C260M

B. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

C. Air Entrainment Admixture: ASTM C260/C260M.

2.04 CURING MATERIALS

A. No curing or Hardening Agents: No curing agents, sealers, or hardener shall be used to aid in curing of concrete. If present these compounds must be removed by shot blasting or scarifying prior to installation of synthetic surface. Chemical curing agents, sealer, or hardeners may have an adverse effect on the adhesion of the synthetic track surface to the concrete base.

2.05 CONCRETE MIX DESIGN

A. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.

B. Normal Weight Concrete:

1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
2. Fly Ash Content: Maximum 20 percent of cementitious materials by weight.
3. Water-Cement Ratio: As indicated on structural drawings..
4. Total Air Content: As indicated on structural drawings.
5. Maximum Slump: 3-1/2 inches at point of placement.
6. No water shall be added at job site.

2.06 MONOLITHICALLY POURED SEAMLESS CONCRETE SLAB

A. Basis of Design: MagicSlab TM (magicslab.net)

B. Subsitutions: See Section01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Accurately position and support reinforcement, and secure against displacement.

3.02 PLACING CONCRETE

A. Place concrete in accordance with ACI PRC-304.

B. Place 4” minimum concrete over 4 inches of ¾ inch crushed aggregate base course.

C. Locate and install contraction, construction, isolation, and expansion joints as indicated or required.

D. Place concrete in a continuous operation within planned joints or sections. Do not add water to adjust slump.

E. Place pre-cast concrete catch basin as indicated and install according to ASTM C891. Connect to existing drainage system if any. Verify existing conditions and report findings to architect.

3.03 CONCRETE FINISHING

A. Float surfaces to true planes within a tolerance of 1/4 inch in 10 feet (1:480) and medium-to-fine-textured broom finish.

B. Tool edges and joints to a radius of 1/4 inch (6 mm)

3.04 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.

3.05 FIELD QUALITY CONTROL

A. Owner will employ a testing agency to sample concrete, perform tests, and submit test reports during concrete placement. Every concrete truck shall be tested.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

3.06 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by CMGC Contractor when defective concrete is identified.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.07 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface for at least 14 days.

B. Hot Weather: ACI 305R

1. Reduce temperature of mix ingredients or use an admixture appropriate to job conditions when air temperature is over 75 deg. F.

END OF SECTION 03 3000

SECTION 04 0511
MASONRY MORTARING AND GROUTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. See Structural drawaings for grout and other mortar.

B. Grout for masonry.

1.02 RELATED REQUIREMENTS

A. Section 04 2000 - Unit Masonry: Installation of mortar and grout.

1.03 REFERENCE STANDARDS

A. ASTM C91/C91M - Standard Specification for Masonry Cement; 2023.

B. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2024.

C. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.

D. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar; 2023.

E. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

F. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.

1.04 SUBMITTALS

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

B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.

C. Samples: Submit two samples of mortar, illustrating mortar color and color range.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.06 FIELD CONDITIONS

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 MORTAR AND GROUT APPLICATIONS

A. At CMGC Contractor 's option, mortar and grout may be field-mixed from packaged dry materials, made from factory premixed dry materials with addition of water only, or ready-mixed.

B. Mortar Mix Designs: ASTM C270, Property Specification.
   1. Exterior, Loadbearing Masonry: Type S as per General Structual Notes.
   2. Exterior, Non-loadbearing Masonry: Type S as per General Structual Notes.
   3. Interior, Loadbearing Masonry: Type S as per General Structual Notes.
   4. Interior, Non-loadbearing Masonry: Type S as per General Structual Notes.

2.02 MATERIALS

A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
   1. Type: Type S as per General Structual Notes.

2. Color: Selected by Architect.

B. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
1. Color(s): As selected by Architect from manufacturer's full range.

C. Water: Clean and potable.

D. Bonding Agent: Latex type.

2.03 MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio; mix in accordance with manufacturer's instructions, uniform in coloration.

D. Do not use anti-freeze compounds to lower the freezing point of mortar.

E. If water is lost by evaporation, re-temper only within two hours of mixing.

2.04 GROUT MIXING

A. Mix grout in accordance with ASTM C94/C94M.

B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.

PART 3 EXECUTION

3.01 PREPARATION

A. Apply bonding agent to existing concrete surfaces.

B. Plug clean-out holes for grouted masonry with brick masonry units. Brace masonry to resist wet grout pressure.

3.02 INSTALLATION

A. Install mortar and grout to requirements of section(s) in which masonry is specified.

B. Work grout into masonry cores and cavities to eliminate voids.

C. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.

D. Do not displace reinforcement while placing grout.

E. Remove excess mortar from grout spaces.

3.03 GROUTING

A. Use either high-lift or low-lift grouting techniques, at CMGC Contractor 's option, subject to other limitations of Contract Documents.

B. Low-Lift Grouting:
1. Limit height of pours to 12 inches.
2. Limit height of masonry to 16 inches above each pour.
3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.

C. High-Lift Grouting:
1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
2. Place grout for spanning elements in single, continuous pour.

END OF SECTION 04 0511

SECTION 04 2900
ENGINEERED UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clay facing brick.

B. Hollow brick.

C. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 04 0511 - Masonry Mortaring and Grouting.

1.03 REFERENCE STANDARDS

A. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2023.

B. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); 2023.

C. ASTM C652 - Standard Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale); 2022.

D. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

1.04 SUBMITTALS

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

1.05 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

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 FIELD CONDITIONS

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 BRICK UNITS

A. Manufacturers:

B. Facing Brick: ASTM C216, Type FBX, Grade SW.
   1. Actual Size: Match existing .
   2. Special Shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

C. Hollow Facing and Building Brick: ASTM C652, Grade SW; Type HBX; Class H40V or H60V, as required by conditions.
   1. Color and Texture: Match existing.
   2. Actual Size: Match existing.
   3. Compressive Strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.

2.02 MORTAR AND GROUT MATERIALS

A. Mortar and Grout: As specified in Structural Drawings. Color: Match existing.

2.03 ACCESSORIES

A. Weeps:
   1. Type: Polyester mesh.
   2. Color(s): As selected by Architect from manufacturer's full range.

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. Direct and coordinate placement of metal anchors supplied for installation under other sections.

3.03 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.

3.04 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. Remove excess mortar as work progresses.

D. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

E. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.05 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

B. Install cavity vents in veneer and cavity walls at 32 inches on center horizontally below shelf angles and lintels and near top of walls.

3.06 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.

3.07 GROUTING

A. Use either high-lift or low-lift grouting techniques, at CMGC Contractor 's option, subject to other limitations of Contract Documents.

B. High-Lift Grouting:
   1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
   2. Place grout for spanning elements in single, continuous pour.

3.08 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

3.09 BUILT-IN WORK

A. Do not build into masonry construction organic materials that are subject to deterioration.

3.10 TOLERANCES

A. Install masonry within the site tolerances found in TMS 402/602.

3.11 CLEANING

A. Remove excess mortar and mortar smears as work progresses.

B. Replace defective mortar. Match adjacent work.

C. Use non-metallic tools in cleaning operations.

3.12 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION 04 2900

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SECTION 05 1200
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel framing members.

B. Structural steel support members and struts.

C. Base plates, shear stud connectors and expansion joint plates.

D. Grouting under base plates.

1.02 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; 2023.

B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2022.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

D. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2018.

E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

H. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric); 2021a.

I. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2022.

J. 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; 2023.

K. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2019.

L. ASTM F959/F959M - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series; 2017a.

M. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.

N. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2023.

O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

P. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

Q. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2020.

R. SSPC-SP 3 - Power Tool Cleaning; 2018.

S. UL (FRD) - Fire Resistance Directory; Current Edition.

1.03 SUBMITTALS

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

B. Shop Drawings:

1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
2. Connections not detailed.
3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

D. Fabricator Test Reports: Comply with ASTM A1011/A1011M.

1.04 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."

B. Fabricator: Company specializing in performing the work of this section with minimum years (5) years of documented experience.

C. Erector: Company specializing in performing the work of this section with minimum five (5) years of documented experience.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Comply with UL (FRD) Assembly Design No. P 719.

2.02 MATERIALS

A. Steel Angles and Plates: ASTM A36/A36M.

B. Steel W Shapes and Tees: ASTM A992/A992M.

C. Rolled Steel Structural Shapes: ASTM A992/A992M.

D. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade C.

E. Hot-Formed Structural Tubing: ASTM A501/A501M, seamless or welded.

F. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.

G. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A.

H. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563/A563M nuts and ASTM F436/F436M washers.

I. Tension Control Bolts: Twist-off type; ASTM F3125/F3125M.

J. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563/A563M nuts and ASTM F436/F436M Type 1 washers.

K. Headed Anchor Rods: ASTM F1554 Grade 36, plain.

L. Load Indicator Washers: Provide washers complying with ASTM F959/F959M at connections requiring high-strength bolts.

M. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

N. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.

O. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

P. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.03 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Space shear stud connectors as indicated on Structural Drawings.

C. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

D. Fabricate connections for bolt, nut, and washer connectors.

E. Develop required camber for members.

2.04 FINISH

A. Prepare structural component surfaces in accordance with SSPC-SP 3.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

A. Erect structural steel in compliance with AISC 303.

B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components and shear studs indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".

E. Do not field cut or alter structural members without approval of Architect.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

END OF SECTION 05 1200

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SECTION 05 1213
ARCHITECTURALLY-EXPOSED STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Additional requirements for structural steel members designated as architecturally-exposed structural steel (AESS).

1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing: General requirements for structural steel members, including AESS framing specified in this section.

B. Section 09 9113 - Exterior Painting: Finish coat requirements and coordination with primer and surface preparation specified in this section.

C. Section 09 9123 - Interior Painting: Finish coat requirements and coordination with primer and surface preparation specified in this section.

D. Section 09 9600 - High-Performance Coatings: Finish coat requirements and coordination with primer and surface preparation specified in this section.

1.03 REFERENCE STANDARDS

A. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2022.

B. AISC 360 - Specification for Structural Steel Buildings; 2022.

C. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling; 2023.

D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

E. ASTM A1085/A1085M - Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS); 2022.

F. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

G. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

H. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.04 SUBMITTALS

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

B. Product data for each type of product specified. Submit paint systems in accordance with Section 09 9113.

C. Shop Drawings: Detailing for fabrication of AESS components.
   1. Provide erection documents clearly indicating which members are AESS members and the AESS category of each part.
   2. Include details that clearly identify AESS requirements found in this specification. Provide connections for AESS consistent with concepts shown on drawings.
   3. Indicate welds by AWS A2.4 symbols, distinguishing between shop and field welds, and show size, length and type of each weld. Identify grinding, finish and profile of welds as defined by the designated AESS category.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Handle finished pieces in accordance with Section 10 of AISC 303, using nylon-type slings, or chains with softeners, or wire ropes with softeners such that they are not damaged.

B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. Use special care in handling to prevent twisting or warping of AESS members.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Comply with Section 05 1200, except as amended in this section for aesthetic purposes.

2.02 FABRICATION

A. Fabricate and assemble AESS in shop to greatest extent possible. Locate field joints in AESS assemblies at concealed locations or as approved by Architect. Detail AESS assemblies to minimize field handling and expedite erection.

B. Permissible tolerances for member depth, width, out of square, and camber and sweep to be as specified in ASTM A6/A6M, ASTM A500/A500M, and ASTM A1085/A1085M.

C. Use special care in handling and shipping of AESS both before and after shop painting to minimize damage to any shop finish. Use nylon-type slings or softeners when using chains or wire rope slings.

D. Fabricate AESS in accordance with categories defined in AISC 303, as follows:

2.03 PAINT SYSTEM

A. Compatibility: All components/procedures of AESS paint system to comply with coating system specified, submitted, and approved per Sections 09 9113, 09 9123, and 09 9600. As a minimum, identify required surface preparation, primer, intermediate coat (if applicable), and finish coat. Primer, intermediate coating, and finish coating to be from a single manufacturer combined in a system documented by manufacturer with adequate guidance for fabricator to procure and execute.

B. Primer: As specified in Sections 09 9113, 09 9123, and 09 9600. Primer to comply with all federal standards for VOC, lead and chromate levels.

2.04 SHOP PRIMING

A. Surface Preparation:
   1. Provide surface preparations to meet SSPC-SP 6.
   2. Coordinate required surface profile with approved paint submittal prior to beginning surface preparation.
   3. Prior to blasting, remove any grease and oil using solvent cleaning to meet SSPC-SP 1.
   4. Remove weld spatter, slivers and similar surface discontinuities.
   5. Ease sharp corners resulting from shearing, flame cutting or grinding.

B. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.05 MATERIALS

A. General: Meet requirements of 05 1200 as amended below.

PART 3 EXECUTION

3.01 EXAMINATION

A. Erector to check all AESS members upon delivery for twist, kinks, gouges or other imperfections which may result in rejection of appearance of member. Coordinate remedial action with fabricator prior to erecting steel.

3.02 PREPARATION

A. Provide connections for temporary shoring, bracing and supports only where noted on approved fabrication documents. Temporary connections not shown are to be made at locations not exposed to view in final structure or as approved by Architect.

B. Handle, lift and align pieces using nylon straps or chains with softeners required to maintain appearance of AESS through process of erection.

3.03 CLEANING

A. Touch-up Painting: Complete cleaning and touch-up painting of field welds, bolted connections, and abraded areas of shop paint to blend with adjacent surfaces of AESS. Perform touch-up work in accordance with manufacturer's instructions and as specified in Section 09 9113, 09 9123, and 09 9600.

END OF SECTION 05 1213

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SECTION 05 4000
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formed steel stud exterior wall and interior wall framing.

B. Exterior wall sheathing.

C. Formed steel joist and purlin framing and bridging.

1.02 RELATED REQUIREMENTS

A. Section 04 2613 - Masonry Veneer: Veneer masonry supported by wall stud metal framing.

B. Section 05 3100 - Steel Decking.

C. Section 06 1000 - Rough Carpentry: Wood blocking and miscellaneous framing.

D. Section 07 2100 - Thermal Insulation: Insulation within framing members.

E. Section 07 6200 - Sheet Metal Flashing and Trim: Head and sill flashings.

F. Section 07 9200 - Joint Sealants.

G. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

H. Section 09 5100 - Acoustical Ceilings: Ceiling suspension system.

1.03 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2020).

A. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015, with Errata (2020).

B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

C. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.

D. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.

E. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020.

F. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.

G. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

H. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018, with Errata (2022).

I. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

1.05 SUBMITTALS

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

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Design Requirements: Design cold-formed framing systems, components and connectors to withstand specified design loads in compliance with ICC (IBC), ASCE 7, AISI S100, and AISI S240.

2.02 MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.

2.03 STRUCTURAL FRAMING COMPONENTS

A. Wall Studs and Track Sections: AISI S240; c-shaped studs and u-shaped track sections in stud-matching nominal width and compatible height.

2.04 MISCELLANEOUS CONNECTIONS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot-dip galvanized per ASTM A153/A153M.

B. Anchorage Devices: Powder actuated.

2.05 SHEATHING

A. Gypsum Board Wall Sheathing: See Section 09 2116.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Install structural members and connections in compliance with ASTM C1007.

3.02 INSTALLATION OF STUDS

A. Install load-bearing studs full length in one piece. Splicing of studs is not permitted.

B. Install intermediate studs above and below openings to align with wall stud spacing.

C. Provide deflection allowance in stud track, directly below horizontal building framing at non-loadbearing framing.

3.03 INSTALLATION OF JOISTS AND PURLINS

A. Place joists at 16 inches on center; not more than 2 inches from abutting walls, and connect joists to supports using fastener method.

3.04 INSTALLATION OF WALL SHEATHING

A. Install wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.

1. Provide steel diagonal bracing at corners with foam insulation or gypsum board wall sheathing.

END OF SECTION 05 4000

SECTION 05 5000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items.

B. Prefabricated ladders and ship ladders.

C. Steel framing and supports for countertops.

1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing: Structural steel column anchor bolts.

B. Section 05 2100 - Steel Joist Framing: Structural joist bearing plates, including anchorage.

C. Section 05 3100 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.

D. Section 05 5100 - Metal Stairs.

E. Section 05 5213 - Pipe and Tube Railings.

F. Section 06 4100 - Architectural Wood Casework

G. Section 09 9113 - Exterior Painting: Paint finish.

H. Section 09 9123 - Interior Painting: Paint finish.

1.03 REFERENCE STANDARDS

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008 (Reaffirmed 2018).

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.

D. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.

E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

F. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

G. 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; 2023.

H. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

I. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

J. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

K. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.04 SUBMITTALS

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

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.

F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, 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. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
   1. Side Rails: 1/2 x 2 inches members spaced at 18 inches.
   2. Rungs: one inch diameter solid round knurled bar spaced 12 inches on center.
   3. Space rungs 7 inches from wall surface.

B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

C. Lintels: As detailed; prime paint finish.

D. Door Frames for Overhead Door Openings and Wall Openings: Channel and Angle sections; prime paint finish.

E. Steel Counter Support Brackets: Made from 2 x 2 x 1/4 inch angles secured to the floor system. The vertical leg of the support embedded within the wall assembly and the horizontal leg protruding from the wall to receive the countertop. See drawings for complete detail.

2.04 FINISHES - STEEL

A. Prime paint steel items.
   1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry.
   2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

C. Prime Painting: One coat. Apply two coats to surfaces which are inaccessible after assembly or erection.

D. Powder coat exterior handrails, ladders, and interior countertop support brackets. Thermosetting polyester 1.5 mils cured film thickness. Color to be selected by architect from manufactures full range of colors.

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 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components as indicated on drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasionsand surfaces not shop primed or galvanized , except surfaces to be in contact with concrete.

3.04 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 05 5000

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SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES (SEE STRUCTURAL SHEET NOTES)

A. Nonstructural dimension lumber framing.

B. Rough opening framing for doors, windows, and roof openings.

C. Sheathing.

D. Roof-mounted curbs.

E. Roofing nailers.

F. Preservative treated wood materials.

G. Fire retardant treated wood materials.

H. Miscellaneous framing and sheathing.

I. Communications and electrical room mounting boards.

J. Concealed wood blocking, nailers, and supports.

K. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing: Prefabricated beams and columns for support of wood framing.

B. Section 05 5000 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.

C. Section 07 6200 - Sheet Metal Flashing and Trim:

1.03 REFERENCE STANDARDS

A. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2024.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

C. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2017).

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

E. AWPA U1 - Use Category System: User Specification for Treated Wood; 2024.

F. PS 1 - Structural Plywood; 2023.

G. PS 20 - American Softwood Lumber Standard; 2021.

1.04 SUBMITTALS

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

B. Product Data: Provide technical data on wood preservative materials.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir, unless otherwise indicated.See structural dwgs
   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.

B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: Nominal sizes as indicated on drawings, S4S.

B. Moisture Content: S-dry or MC19.

C. Stud Framing (2 by 2 through 2 by 6):
   1. Grade: No. 2. or better

D. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
   1. Machine stress-rated (MSR) as follows:
   2. Species: Douglas Fir.

E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: 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. 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.

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. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
   2. 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. Fire Retardant Treatment:
   1. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
      a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
      b. Treat exterior rough carpentry items.
      c. Do not use treated wood in direct contact with the ground.
   2. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated;

capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.

a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
b. Treat rough carpentry items as indicated .
c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. Preservative Treatment:

1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
   a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   b. Treat lumber exposed to weather.
   c. Treat lumber in contact with roofing, flashing, or waterproofing.
   d. Treat lumber in contact with masonry or concrete.
   e. Treat lumber less than 18 inches above grade.
   f. Treat lumber in other locations as indicated.
2. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
   a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
   b. Treat plywood in contact with roofing, flashing, or waterproofing.
   c. Treat plywood in contact with masonry or concrete.
   d. Treat plywood less than 18 inches above grade.
   e. Treat plywood in other locations as indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.

B. Coordinate installation of rough carpentry members specified in other sections.

3.02 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.

3.03 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.

E. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.

F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 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. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

D. Provide the following specific nonstructural framing and blocking:
   1. Cabinets and shelf supports.
   2. Wall brackets.
   3. Handrails.
   4. Grab bars.
   5. Towel and bath accessories.
   6. Wall-mounted door stops.
   7. Wall mounted medical equipment or other as directed by owner
   8. Art work as directed by owner
   9. Chalkboards and marker boards.
   10. Wall paneling and trim.
   11. Joints of rigid wall coverings that occur between studs.

3.05 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 prefabricated curbs are specified and where specifically indicated otherwise; form corners by alternating lapping side members.

3.06 INSTALLATION OF CONSTRUCTION PANELS

A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.

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 and Location: As indicated on drawings.

3.07 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.

3.08 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 06 1000

SECTION 06 2000
FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Finish carpentry items.

B. Solid surface interior window stools (sills).

1.02 RELATED REQUIREMENTS

A. Section 06 4100 - Architectural Wood Casework: Shop fabricated custom cabinet work.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

C. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 SUBMITTALS

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

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
   2. Include certification program label.

C. Samples: Submit two samples solid surface.

1.05 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.

B. Quality Certification:
   1. Provide labels or certificates indicating that work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
   2. Provide designated labels on shop drawings as required by certification program.
   3. Provide designated labels on installed products as required by certification program.
   4. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect from moisture damage.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Interior Woodwork Items:
   1. Window Sills: Solid Surface.

2.02 LUMBER MATERIALS

2.03 PLASTIC LAMINATE MATERIALS

A. Plastic Laminate: NEMA LD 3, HGS; color as selected by Architect; finish as selected.

B. Solid e: 1/2" thk window sills with eased edges equivilent to Willsonart-Gibralter, Dupont-Corian, or equivilent. Color as selected by architect from manufacturers standard. color, and surface texture as selected.

C. Laminate Adhesive: Type recommended by laminate manufacturer to suit application; not containing formaldehyde or other volatile organic compounds.

2.04 FASTENINGS

A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.

B. Fasteners: Of size and type to suit application. None - N/ANone - N/A

2.05 ACCESSORIES

A. Primer: Alkyd primer sealer.

B. Wood Filler: Solvent base, tinted to match surface finish color.

2.06 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. Cap exposed plastic laminate finish edges with material of same finish and pattern.

C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.07 SHOP FINISHING

A. Apply wood filler in exposed nail and screw indentations.

B. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:

1. Transparent:
   a. System - 11 Polyurethane Catalyzed.
   b. Sheen: Satin. Open grain

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

3.02 INSTALLATION

A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.

B. Set and secure materials and components in place, plumb and level.

C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.03 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.04 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION 06 2000

SECTION 06 4100
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Galvanized steel countertops.

B. Solid surface window sills.

C. Metal knee brace.

D. Cabinet and drawer hardware.

1.02 RELATED REQUIREMENTS

A. Seciton 05 5000 - Metal Fabrications

B. Section 06 1000 - Rough Carpentry.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

C. BHMA A156.9 - Cabinet Hardware; 2020.

D. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 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. Samples: Submit actual sample items of all proposed hardware including pulls and hinges, demonstrating hardware design, quality, and finish. Submit samples of all millwork finishs.

1.05 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications: Firm specializing in fabricating and installing products specified in this section with minimum five years of documented experience; with qualifications indicating ability to comply with requirements of this section.

1.06 MOCK-UPS

A. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware and finishes.

B. Locate where directed.

C. Mock-up may remain as part of work.

1.07 DELIVERY, STORAGE, AND HANDLING

1.08 FIELD CONDITIONS

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Single Source Responsibility: Provide and install this work from single fabricator.

2.02 ARCHITECTURAL WOOD CASEWORK

A. Provide casework and casework components in sizes and profiles as indicated on drawings.

2.03 CABINETS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.

B. Plastic Laminate Faced Cabinets: Custom grade.

C. Breakroom Cabinets: Plastic laminate faced, Custom grade.

D. Cabinets:
   1. Finish - Exposed Exterior Surfaces: Decorative laminate.Where indicated on drawings.
   2. Finish - Exposed Interior Surfaces: Decorative laminate where indicated on drawings.
   3. Finish - Semi-Exposed Surfaces: Decorative laminate
   4. Finish - Concealed Surfaces: Melamine.
   5. Door and Drawer Front Edge Profiles: Square edge.
   6. Casework Construction Type: Type A - Frameless - Flush Overlay.
   7. Grained Face Layout for Cabinet and Door Fronts: Flush panel.
      a. Custom Grade: Doors, drawer fronts and false fronts wood grain to run and match vertically within each cabinet unit.
   8. Adjustable Shelf Loading: 40 psf.
   9. Cabinet Style: Flush overlay.
   10. Drawer Side Construction: Multiple-dovetailed.
   11. Drawer Construction Technique: Dovetail joints.
   12. Shelves to be 1" min thickness typical including upper cabinet bottoms.
   13. Drawer Box Material: Baltic Birch.

2.04 CONCEALED CABINET BASE COMPONENTS

A. Cabinet Base Toe-Kick Subfronts:

A. Cabinet Base Blocking and Stretchers:

A. Cabinet Base Sleepers:

2.05 WOOD AND WOOD-BASED MATERIALS

2.06 LAMINATE MATERIALS

A. Manufacturers:
   1. Formica Corporation; None - N/A: www.formica.com/#sle.
   2. Panolam Industries International, Inc; Nevamar; None - N/A: www.nevamar.com/#sle.
   3. Wilsonart LLC; None - N/A: 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 for counter tops: HGS, 0.048 inch nominal thickness, through color, see plans fo
   2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, see plans for color and finish.
   3. Post-Formed Horizontal Surfaces: HGP, 0.039 inch nominal thickness.
   4. Cabinet Liner: CLS, 0.020 inch nominal thickness.
   5. Colors: Up to seven (7) colors of plastic laminate may be selected by Architect from Manufacturer's standard and premium colors.

2.07 COUNTERTOPS

A. Plastic Laminate Countertops: Medium density fiberboard substrate covered with HPDL, conventionally fabricated and self-edge banded. and 1-1/2" 3mm pvc edge color as selected by architect

B. Solid Surface Countertops/Window Sills
   1. Quality standard: Comply with AWS Section 11 requirements for solid surface countertops
   2. Grade: Custom
   3. 1/2" min thickness with 1-1/2" squared edges.
   4. Color as selected in plans

2.08 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Plastic Edge Banding: Extruded PVC, 3mm smooth finish;
   1. Color: As selected by Architect from manufacturer's full range. Match laminate materials noted in the notes section of the millwork groupings.
   2. Color: As indicated on drawings.
   3. Use at all exposed shelf edges.
   4. Provide to the owner 10% extra stock for each color of edge banding used on the project.

C. Mirrors: Glass mirrors as shown attached to cabinets are work of this section.

D. Fasteners: Size and type to suit application.

E. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

F. Grommets: Standard plastic grommets for cut-outs, in color as selected by architect.
   1. Provide 5 per work station at reception desks and countertops with knee space below. Locate per owner requirements.

G. Knee braces: as provided by Section 05 5000

2.09 HARDWARE

A. Hardware: BHMA A156.9, types as indicated for quality grade specified.

B. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports 32 mm @ 1 inch centers.
   1. Product: 345 NP manufactured by K&V.

C. Drawer and Door Pulls: back mounted.

D. Cabinet Locks: Manufacturer's standard ANSI/BHMA, Grade 1, (5) pin-tumbler deadbolt type locks. All cabinet doors and drawers shall be locked unless noted otherwise on drawings.
   1. Small pin-tumbler or interchangeable core deadbolt style with heavy duty deadbolt.
      a. Disc-tumbler type locks will not be not accepted.
      b. Cam locks will not be not accepted.
   2. Base Products:
      a. Door locks ANSI number E07121.
         1) Product Standard: Olympus 100DR.
      b. Door locks ANSI number E07041.
         1) Product Standard: Olympus 200DW.
   3. Finish: Satin Chrome.
   4. Keying: Coordinated keying with the District.
      a. Direct any questions to: Travis Lindsley, phone: (385) 309-7843, email: trlindsey@wsd.net
      b. Key locks within each room alike - Refer to Key Schedule.
      c. Key rooms differently from each other.
      d. Master key all locks, furnish (6) mater keys to owner.
      e. Master key system must accommodate a minimum of 2,000 key changes.

E. Catches: Magnetic.

F. Slide bolt latch at double doors.

G. Drawer Slides:
   1. Type: Full extension.
   2. Static Load Capacity: Pencil drawers 45 lbf, Box drawers 100 lbf and, File drawers 200 lbf.
   3. Mounting: Side mounted.
   4. Stops: Integral type.

H. Hinges: European style concealed self-closing type, 170 degree snap on type, steel with satin finish.

I. File Drawer Inserts: provide bar type file drawer inserts to accomodate "letter" and "legal" size hanging files.

J. Closet rods K&V-880

K. Coat hooks equivilent to EPCO CH201-ZC.

2.10 SHOP TREATMENT OF WOOD MATERIALS

2.11 FABRICATION

A. Fabricate to maximum extents plausible, including doors, drawers, and hardware; fabricate units in sizes transportable through building openings.

B. Matching Wood Grain: Comply with requirements of quality standard for specified Grade. "None - N/A"

C. Provide cutouts for plumbing fixtures; verify locations of cutouts from on-site dimensions. Sand and seal cut edges.

2.12 SHOP FINISHING

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify casework and materials required for installation have been delivered, handled and stored as specified.

B. Verify wood blocking that provides casework backing is installed as indicated on drawings.

C. Verify location and sizes of rough-in plumbing and rough-in electrical associated with work of this section.

3.02 INSTALLATION

A. Install and secure work of this section in accordance with specified performance requirements.

B. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose. Provide continous sealant a butting adjacent surfaces. color as selected by architect.

3.03 ADJUSTING

A. Test installed work for rigidity and ability to support loads. Adjust as required.

B. Adjust hardware for smooth operation in accordance with hardware manufacturer's documented instructions.

3.04 CLEANING

A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.

B. Clean exposed surfaces of casework, shelving, and hardware.

END OF SECTION 06 4100

SECTION 07 1900
WATER REPELLENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water repellents applied to exterior and interior, masonry surfaces.

B. Pressure washing.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 REFERENCE STANDARDS

A. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2023a.

B. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 2021.

1.04 SUBMITTALS

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

B. Product Data: Provide product description, details of tests performed, limitations, and chemical composition.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention; cautionary procedures required during application.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer's Field Reports: Report whether manufacturer's "best practices" are being followed; if not, state corrective recommendations. Email report to Architect the same day as inspection occurs; mail report on manufacturer's letterhead to Architect within 2 days after inspection.

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 Water Repellent Material: 5 gallons of type installed.

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. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience

C. Owner reserves the right to provide continuous independent inspection of surface preparation and application of water repellent.

1.06 MOCK-UPS

A. Prepare a representative surface 48 inch by 48 inch in size using specified materials and preparation and application methods on surfaces identical to those to be coated; approved mock-up constitutes standard for workmanship.

B. Mock-up may remain as part of work.

1.07 FIELD CONDITIONS

A. Protect liquid materials from freezing.

B. Do not apply water repellent when ambient temperature is lower than 50 degrees F or higher than 90 degrees F.

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. Provide five year manufacturer warranty for water repellent.
   1. Include coverage for degradation of waterproofing ability and reduction in graffiti resistance on designated substrate.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Silane, Siloxane, Silane-Siloxane Blend, and Siliconate Water Repellents and Graffiti Control:
   1. PROSOCO, Inc; Sure Klean® Weather Seal Blok-Guard® & Graffiti Control : www.prosoco.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

A. Water Repellent: Non-glossy, colorless, penetrating, water-vapor-permeable, non-yellowing sealer, that dries invisibly leaving appearance of substrate unchanged.
   1. Applications: Vertical surfaces and non-traffic horizontal surfaces.
   2. Number of Coats: Two.
   3. VOC Content: See Section 01 6116.
   4. Moisture Absorption When Applied to Masonry: Five percent, maximum, when tested in accordance with ASTM C140/C140M using masonry sample completely coated with water repellent.
   5. Moisture Absorption When Applied to Concrete: Five percent, maximum, when tested in accordance with ASTM C642 concrete sample completely coated with water repellent.
   6. Maintains dry appearance when wetted.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify joint sealants are installed and cured.

C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of water repellent.

3.02 PREPARATION

A. Protection of Adjacent Work:
   1. Protect adjacent landscaping, property, and vehicles from drips and overspray.
   2. Protect adjacent surfaces not intended to receive water repellent.

B. Prepare surfaces to be coated as recommended by water repellent manufacturer for best results.

C. Do not start work until masonry mortar substrate is cured a minimum of 60 days.

D. Remove oil and foreign substances with a chemical solvent that will not affect water repellent.

E. Pressure wash surfaces to be coated.

F. Allow surfaces to dry completely to degree recommended by water repellent manufacturer before starting coating work.

3.03 APPLICATION

A. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended as producing the best results.

B. Apply at rate recommended by manufacturer, continuously over entire surface.

C. Apply two coats, minimum.

D. Remove water repellent from unintended surfaces immediately by a method instructed by water repellent manufacturer.

END OF SECTION 07 1900

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SECTION 07 2100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation at perimeter foundation wall and exterior wall behind _____ wall finish.

B. Batt insulation and vapor retarder and vapor retarder in exterior wall and wall construction.

C. Batt 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; 2023.

B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2023.

C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

E. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2024.

1.03 SUBMITTALS

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

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

F. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of contractor accreditation and installer certification on project site during and after installation. Present on-site documentation upon request.

1.04 QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:

1. Installer Qualification: Use accredited contractors, certified installers, evaluated materials, and third-party field quality control audit.
2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

1.05 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 at Perimeter of Foundation: Extruded polystyrene (XPS) board.

B. Insulation in Metal Framed Walls: Batt insulation with separate vapor retarder.

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: Type IV, 25 psi (173 kPa), minimum.
   2. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
   3. Board Edges: Square.
   4. Type and Water Absorption: Type XII, 0.3 percent by volume, maximum, by total immersion.
   5. Products:
      a. DuPont de Nemours, Inc; Styrofoam Brand _____: building.dupont.com/#sle.
      b. Kingspan Insulation LLC; GreenGuard GG25-LG XPS Insulation Board: www.kingspan.com/#sle.
      c. Kingspan Insulation LLC; GreenGuard XPS TYPE VI 40 PSI: www.trustgreenguard.com/#sle.
      d. Owens Corning Corporation; FOAMULAR Type ___ Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/#sle.
      e. Substitutions: See Section 01 6000 - Product Requirements.

B. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, comply with ASTM C1289.
   1. Classifications:
      a. Type VII: Faced with glass mat faced gypsum board on one major surface of the core foam and faced on the other major surface with any facer described in this specification.
         1) Compressive Strength: 16 psi, minimum.
         2) Thermal Resistance, R-value: At 2 inch thick; 7.0, minimum, at 75 degrees F.
   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. Board Size: 48 inch by 96 inch.
   5. Board Thickness: 2.0 inch.
   6. Products:
      a. DuPont de Nemours, Inc: building.dupont.com/#sle.
      b. GAF: www.gaf.com/#sle.
      c. Johns Manville: www.jm.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.

2.03 M FIBER BLANKET INSULATION MATERIALS

A. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
   1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 10, when tested in accordance with ASTM E84.
   3. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
   4. Formaldehyde Content: Zero.
   5. Thickness: 3 inch.
   6. Sound Transmission Class: STC 49
   7. Products:
      a. CertainTeed Corporation: www.certainteed.com/#sle.
      b. Johns Manville: www.jm.com/#sle.
      c. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.

B. Mineral Wool Blanket Thermal Insulation: Flexible or semi-rigid preformed insulation, complying with ASTM C665.
   1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.

3. Products:
    a. Johns Manville: www.jm.com/#sle.
    b. Certain Teed Corporation
    c. Knauf Insulation: www.knaufinsulation.com/#sle.
    d. ROCKWOOL: www.rockwool.com/#sle.
    e. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ACCESSORIES

A. Acoustic Caulk and Outlet Putty Packs: In accordance to Section 09 2116 Gypsum Board Assemblies.

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.

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 EXTERIOR WALLS

A. Adhere 6 inches wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.

B. Apply adhesive to back of boards:

C. Install boards horizontally on walls.
    1. Place boards to maximize adhesive contact.
    2. Butt edges and ends tightly to adjacent boards and protrusions.

D. Extend boards over expansion joints, unbonded to wall on one side of joint.

E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements for additional requirements.

3.04 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION 07 2100

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SECTION 07 2119
FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Foamed-in-place insulation.

B. Protective cementitious coating.

1.02 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 D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2019.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.

E. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

F. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.

G. FM 4880 - Examination Standard for Class 1 Fire Rating of Building Panels or Interior Finish Materials; 2022.

H. NFPA 275 - Standard Method of Fire Tests for the Evaluation of Thermal Barriers; 2022.

I. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

J. UL 1040 - Standard for Safety Fire Test of Insulated Wall Construction; Current Edition, Including All Revisions.

K. UL 1715 - Standard for Safety Fire Test of Interior Finish Material; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.04 SUBMITTALS

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

B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.

C. Certificates: Certify that products of this section meet or exceed specified requirements.

D. Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

1.05 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.

B. Installer Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience, and approved by manufacturer.

1.06 FIELD CONDITIONS

A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.

B. Do not apply foam when temperature is within 5 degrees F of dew point.

PART 2 PRODUCTS

2.01 MATERIALS

A. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
   1. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and fire protection requirements.
      a. Fire Protection: Provide 15-minute thermal barrier of 1/2 inch gypsum board or equivalent material complying with NFPA 275 test method, or foamed-in-place insulation either exposed or with covering that complies with FM 4880, NFPA 286, UL 1040, or UL 1715.
   2. Thermal Resistance: R-value of 7.1, minimum, per 1-inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
   3. Water Vapor Permeance: Vapor retarder; 2 perms, maximum, when tested at intended thickness in accordance with ASTM E96/E96M, desiccant method.
   4. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.
   5. Air Permeance: 0.04 cfm per square foot, maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf.
   6. Closed Cell Content: At least 90 percent.
   7. Surface Burning Characteristics: Flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
   8. Manufacturers:
      a. Accella Polyurethane Systems; Quadfoam 2.0: www.accellapolyurethane.com/#sle.
      b. Accella Polyurethane Systems; EcoBay CC: www.accellapolyurethane.com/#sle.
      c. BASF Corporation; WALLTITE US: www.spf.basf.com/#sle.
      d. Carlisle Spray Foam Insulation; SealTite PRO One Zero: www.carlislesfi.com/#sle.
      e. Huntsman Building Solutions; ProSeal HFO: www.huntsmanbuildingsolutions.com/#sle.
      f. Johns Manville; JM Corbond III Closed Cell Spray Polyurethane Foam: www.jm.com/#sle.
   9. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ACCESSORIES

A. Primer: As required by insulation manufacturer.

B. Protective Coating: Cementitious type, spray applied; flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify work within construction spaces or crevices is complete before insulation application.

B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation adhesion.

3.02 PREPARATION

A. Mask and protect adjacent surfaces from over spray or dusting.

B. Apply primer in accordance with manufacturer's instructions.

3.03 APPLICATION

A. Apply insulation in accordance with manufacturer's instructions.

B. Apply insulation by spray method, to a uniform monolithic density without voids.

C. Apply to achieve a thermal resistance R-value of 19.

D. Apply overcoat monolithically, without voids to fully cover foam insulation.

E. Patch damaged areas.

F. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.

G. Trim excess away for applied trim or remove as required for continuous sealant bead.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements for additional requirements.

B. Field inspections and tests will be performed by an independent testing agency.

C. Inspection will include verification of insulation thickness and density.

3.05 PROTECTION

A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION 07 2119

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SECTION 07 2129
SPRAYED INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cellulosic insulation placed in walls.

B. Surface sealer.

1.02 REFERENCE STANDARDS

A. ASTM C739 - Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation; 2021a.

1.03 SUBMITTALS

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

B. Product Data: Provide data on materials, describing insulation properties.

C. Manufacturer's Qualification Statement.

D. Installer's Qualification Statement.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.05 FIELD CONDITIONS

A. Maintain acceptable ambient and substrate surface temperatures prior to, during, and after installation of primer and insulation materials and sealer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cellulosic Fiber Sprayed Insulation:
   1. International Cellulose Corp; K-13: www.spray-on.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

A. Cellulosic Fiber Insulation: ASTM C739; treated cellulosic fiber, black color.
   1. Application location: Cafetorium and stage bottom of roof decks.
   2. Thermal Resistance (R-value): 3.9, at 1 inch thick when tested in accordance with ASTM C177 at 75 degrees F temperature
   3. Density: 2 lb/cu ft, when tested in accordance with ASTM D1622.
   4. Noise Reduction Coefficient (NRC): 0.75 for 1 inch thickness.
   5. Moisture Absorption: Maximum 15 percent by weight.
   6. Flame Spread / Smoke Developed Index: 0-25 / 0-450, Class A, when tested in accordance with ASTM E84.
   7. Combustibility: Passing ASTM E136.

2.03 ACCESSORIES

A. Primer: As required by insulation manufacturer.

B. Surface Sealer: Clear, latex based for placement over insulation.

C. Insulation Stop: Plastic, profiled and sized to suit rafter spacing and wall/sloped roof configuration.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are clean, dry, and free of matter that may inhibit adhesion.

B. Verify that ceiling hangers and supporting clips have been are installed correctly.

C. Verify other work on and within spaces to be insulated is complete prior to application.

3.02 PREPARATION

A. Mask and protect adjacent surfaces from overspray or damage.

B. Apply primer in accordance with manufacturer's instructions.

C. Install insulation stops between rafters at wall/sloped roof construction to prevent insulation from covering soffit vents or from limiting air circulation from soffit to attic space.

3.03 INSTALLATION

A. Install sprayed insulation in accordance with manufacturer's instructions.

B. Install sprayed insulation to a uniform monolithic density without voids.

C. Install to a minimum cured thickness of 1 inch.

3.04 FIELD QUALITY CONTROL

A. Inspection will include verification of sprayed insulation and surface sealer thickness and density.

3.05 PROTECTION

A. Do not permit subsequent construction work to disturb applied sprayed insulation.

END OF SECTION 07 2129

SECTION 07 2500
WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls water vapor resistant and air tight.

1.02 DEFINITIONS

A. Weather Barriers: Materials or assemblies forming water-resistive barriers, air barriers, vapor retarders, or combination of one or more assemblies.

1.03 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; 2021.

1.04 SUBMITTALS

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

B. Product Data: Provide data on material characteristics.

C. Shop Drawings: Provide drawings of special joint conditions.

1.05 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.01 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

A. Air Barrier Sheet, Self-Adhered:
   1. Air Permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
   2. Water Vapor Permeance: 10 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant procedure).
   3. Water Penetration Resistance Around Nails: Pass, when tested in accordance with ASTM D1970/D1970M (modified).
   4. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 90 days of weather exposure.
   5. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less (Class A), when tested in accordance with ASTM E84.
   6. Seam and Perimeter Tape: As recommended by sheet manufacturer.

2.02 ACCESSORIES

A. Flexible Flashing: Self-adhering sheet flashing complying with ASTM D1970/D1970M; waive slip resistance requirement if not installed on roof.
   1. Width: 3 inches.

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.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's installation instructions.

B. Self-Adhered Sheets:
   1. Prepare substrate in accordance with sheet manufacturer's installation instructions; fill and tape joints in substrate and between dissimilar materials.
   2. Lap sheets shingle-fashion to shed water and seal laps airtight.
   3. Upon placement of sheets, firmly press onto substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
   4. Use same material, or other material approved by sheet manufacturer, to seal sheets to adjacent substrates, and as flashing.
   5. At expansion joints, provide transition to joint assemblies approved by sheet manufacturer.

3.04 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION 07 2500

SECTION 07 4213
METAL WALL AND SOFFIT PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured metal panels for exterior walls and soffits, with related flashings and accessory components.

1.02 RELATED REQUIREMENTS

A. Section 07 2100 - Thermal Insulation.

B. Section 07 2500 - Weather Barriers: Weather barrier under wall panels.

C. Section 07 2700 - Air Barriers: Air barrier under wall panels.

D. Section 07 9200 - Joint Sealants: Sealing joints between metal wall panel system and adjacent construction.

E. Section 09 2116 - Gypsum Board Assemblies: Wall panel substrate.

1.03 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); 2022.

B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.

C. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2023.

1.04 SUBMITTALS

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

B. Samples: Submit two samples of wall panel and soffit panel, 12 inches by 12 inches in size illustrating finish color, sheen, and texture.

C. Manufacturer's qualification statement.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in installing products of the type specified in this section with minimum three years of documented experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.

B. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.

C. Prevent contact with materials that may cause discoloration or staining of products.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Finish Warranty: Provide 15-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 warrantor.

PART 2 PRODUCTS

2.01 METAL WALL PANEL SYSTEM

A. Soffit Panels:

1. UNEEKE Manufacturing, Soffit Panel, 1" Flush Panel.
2. Profile: Style as indicated on drawings. 12 or 16" panel width.
3. Color: As indicated on drawings, to be selected from manufacturer's standard range.

B. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

C. Anchors: Galvanized steel.

2.02 MATERIALS

A. Precoated Steel Sheet: Aluminum-zinc alloy-coated steel sheet, ASTM A792/A792M, Commercial Steel (CS)) or Forming Steel (FS), with AZ50/AZM150 coating; continuous-coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

B. Select materials with surface flatness, smoothness, and lack of surface blemishes where exposed to view in finished system.

C. Galvanized metal Z-furring for attachment.

2.03 FINISHES

A. Exposed Surface Finish: Panel manufacturer's standard polyvinylidene fluoride (PVDF) coating, top coat over epoxy primer.

B. Panel Backside Finish: Panel manufacturer's standard siliconized polyester wash coat.

C. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss as selected by Architect from manufacturer’s standard line.

2.04 ACCESSORIES

A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.
   1. Provide gaskets at all dissimilar metal connections.

B. Concealed Sealants: Non-curing butyl sealant or tape sealant, see Section 07 9200

C. Field Touch-up Paint: As recommended by panel manufacturer.

2.05 MOCK-UP

A. Construct a masonry wall and metal panel as a mock-up panel sized 8 feet (2.4 m) long by 6 feet (1.8 m) high; include mortar, accessories, structural backup, metal panel and flashings (with lap joint, corner, and end dam) in mock-up. Can be built in-place. Combine with masonry mockup.

B. Locate where directed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building framing members are ready to receive panels.

B. Verify air barrier, see Section 07 2700, has been installed over wall panel substrate; see Section 05 4000.

3.02 PREPARATION

A. Install subgirts perpendicular to panel length, securely fastened to substrates and shimmed and leveled to uniform plane, and spaced at intervals indicated.

3.03 INSTALLATION

A. Install panels on soffits in accordance with manufacturer's instructions.

B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint; allow to dry prior to wall panel installation.

C. Locate joints over supports.
D. Use concealed fasteners unless otherwise indicated by Architect.
E. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.04 CLEANING

A. Remove site cuttings from finish surfaces.
B. Remove protective material from wall panel surfaces.
C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

END OF SECTION 07 4213

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SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants for joints within sheet metal fabrications.

B. Precast concrete splash pads. Provide at downspouts provided by Section 07 4113

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

D. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

F. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017 (Reapproved 2023).

G. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).

H. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 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, ___ by ___ inches in size, illustrating metal finish color.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 3 years of documented experience.

1.06 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. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch thick base metal.

B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch thick base metal, shop pre-coated with PVDF coating.

1. Polyvinylidene Fluoride (PVDF) Coating: Superior performing organic powder coating, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
2. Color: As selected by Architect from manufacturer's full colors.
   a. Color Schedule (as indicated on drawings)(Note: multiple colors are in use. Plan accordingly):
      1) Color 7 - To be selected by architect.
      2) Color 8 - To be selected by architect.

C. Pre-Finished Aluminum: ASTM B209/B209M, 3005 alloy, H12 or H14 temper; 18 gauge, 0.040 inch thick; plain finish shop pre-coated with silicone modified polyester coating.
   1. Fluoropolymer Coating: High performance organic powder coating, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system.
   2. Color: As selected by Architect from manufacturer's standard colors.

2.02 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 standing seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.

F. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

G. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.03 GUTTERS AND DOWNSPOUTS

A. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3,000 psi at 28 days, with minimum 5 percent air entrainment.

2.04 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Underlayment: ASTM D226/D226M, organic roofing felt, Type I, No. 15.

C. Primer Type: Zinc chromate.

D. Concealed Sealants: Non-curing butyl sealant.

E. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

F. 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. Insert flashings into reglets to form tight fit; secure in place with lead wedges; pack remaining spaces with lead wool; seal flashings into reglets with sealant.

B. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..

C. Apply plastic cement compound between metal flashings and felt flashings.

D. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Seal metal joints watertight.

F. Secure gutters and downspouts in place with concealed fasteners.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION 07 6200

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SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

B. Section 09 2116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

C. Section 09 3000 - Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).

D. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2022.

E. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.

F. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).

G. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

H. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

1.04 SUBMITTALS

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

B. Product Data: Submit manufacturer's technical datasheets 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. Substrates the product should not be used on.
   4. Certification by manufacturer indicating that product complies with specification requirements.

C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Nonsag Sealants:
   1. Dow Chemical Company; None - N/A: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
   2. Pecora Corporation; None - N/A: www.pecora.com/#sle.
   3. Sherwin-Williams Company; None - N/A: www.sherwin-williams.com/#sle.

4. Sika Corporation; None - N/A: www.usa-sika.com/#sle.
5. Substitutions: See Section 01 6000 - Product Requirements.

B. Self-Leveling Sealants:
1. Dow Chemical Company; None - N/A: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
2. Pecora Corporation; None - N/A: www.pecora.com/#sle.
3. Sherwin-Williams Company; None - N/A: www.sherwin-williams.com/#sle.
4. Sika Corporation; None - N/A: www.usa-sika.com/#sle.
5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products with acceptable levels of volatile organic compound (VOC) content; see Section 01 6116.

2.03 NONSAG JOINT SEALANTS

A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Color: To be selected by Architect from manufacturer's full range.
3. Cure Type: _____.
4. Service Temperature Range: Minus 20 to 180 degrees F.
5. Products:
a. Dow; DOWSIL 756 SMS Building Sealant: www.dow.com/#sle.
b. Dow; DOWSIL 790 Silicone Building Sealant: www.dow.com/#sle.
c. Dow; DOWSIL 791 Silicone Weatherproofing Sealant: www.dow.com/#sle.
d. Dow; DOWSIL 795 Silicone Building Sealant: www.dow.com/#sle.
e. Sika Corporation; Sikasil WS-290: www.usa.sika.com/#sle.
f. Sika Corporation; Sikasil WS-295: www.usa.sika.com/#sle.
g. Sika Corporation; Sikasil 728NS: www.usa.sika.com/#sle.
h. Substitutions: See Section 01 6000 - Product Requirements.

B. Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Color: To be selected by Architect from manufacturer's full range.
3. Products:
a. Pecora Corporation; None - N/A: www.pecora.com/#sle.
b. Sika Corporation; Sikasil GP: www.usa.sika.com/#sle.
c. Sika Corporation; Sikasil WS-295: www.usa.sika.com/#sle.
d. Sika Corporation; Sikasil N-Plus US: www.usa.sika.com/#sle.
e. Sika Corporation; Sikasil 728NS: www.usa.sika.com/#sle.
f. Substitutions: See Section 01 6000 - Product Requirements.

C. Polyurethane Sealant for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion; suitable for traffic exposure when recessed below traffic surface .
1. Movement Capability: Plus and minus 35 percent, minimum.
2. Color: To be selected by Architect from manufacturer's full range.
3. Products:
a. Sika Corporation; Sikaflex-1a: www.usa.sika.com/#sle.
b. Sika Corporation; Sikaflex-2c NS: www.usa.sika.com/#sle.
c. Substitutions: See Section 01 6000 - Product Requirements.

D. Non-Sag "Traffic-Grade" Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.

1. Hardness Range: 20 to 30, Shore A, when tested in accordance with ASTM C661.
2. Color: To be selected by Architect from manufacturer's full range.

E. Polysulfide Sealant for Continuous Water Immersion: Polysulfide; ASTM C920, Grade NS, Uses M and A; single component; explicitly approved by manufacturer for continuous water immersion; not expected to withstand traffic.
1. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
2. Color: To be selected by Architect from manufacturer's full range.

F. Type ___ - Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag; not expected to withstand continuous water immersion or traffic.
1. Color: To be selected by Architect from manufacturer's full range.

2.04 SELF-LEVELING JOINT SEALANTS

A. _____ - Flexible Polyurethane Foam: Single-component, gun grade, and low-expanding.
1. Color: White.
2. Products:
a. Tremco Commercial Sealants & Waterproofing; ExoAir LEF: www.tremcosealants.com/#sle.
b. Substitutions: See Section 01 6000 - Product Requirements.

2.05 ACCESSORIES

A. Overlay Extrusion for Glazing System Joint Protection: Rubber profiled extrusions placed over joints in glazing system and provided with watertight seal.
1. Profile: As required to match existing metal glazing cap requirements.
2. Color: As required to match existing conditions.
3. Durometer Hardness, Type A: 65, minimum, when tested in accordance with ASTM D2240.
4. Tensile Strength: 1,139 psi, in accordance with ASTM D412.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. 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.

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 the following, unless otherwise indicated:
   1. Width/depth ratio of 2:1.
   2. Neck dimension no greater than 1/3 of the joint width.
   3. Surface bond area on each side not less than 75 percent of joint width.

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. See Section 01 4000 - Quality Requirements for additional requirements.

3.04 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. 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.

END OF SECTION 07 9200

SECTION 07 9100
PREFORMED JOINT SEALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Precompressed foam seals.

B. Compression gaskets.

C. Preformed strip seals.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. ASTM D1056 - Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber; 2020.

B. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).

C. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements; 1991 (Reapproved 2016).

1.04 SUBMITTALS

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

B. Product Data: Manufacturer's technical data sheets for each product, including chemical composition, movement capability, color availability, limitations on application, and installation instructions.

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a two year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealers that fail to achieve watertight seal or exhibit loss of adhesion or cohesion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Precompressed Foam Seals:

B. Compression Gaskets:

C. Preformed Strip Seals:

2.02 PRECOMPRESSED FOAM SEALS

A. Precompressed Foam Seal: Urethane foam impregnated with water-repellent, with self-adhesive faces protected prior to installation by release paper.
   1. Color: Gray.
   2. Size as required to provide weathertight seal when installed.

2.03 ACCESSORIES

A. Adhesive: As recommended by seal manufacturer.

B. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and strip seal.

C. Substrate Cleaner: Non-corrosive, non-staining type recommended by seal manufacturer; compatible with joint forming materials.

D. Primer: Type recommended by seal manufacturer to suit application; non-staining.

E. Backing Tape: Self-adhesive polyethylene tape with surface that seal will not adhere to.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's written instructions.

B. Precompressed Foam Seals:
   1. Install only when ambient temperature is within recommended application temperature range of adhesive. Consult manufacturer when installing outside this temperature range.
   2. Prepare joints and install seals in accordance with manufacturer's written recommendations.
   3. Remove loose materials and foreign matter that could impair adhesion of sealant.
   4. Do not stretch precompressed seal; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

C. Preformed Strip Seals:
   1. Install when ambient temperature is within recommended application temperature range of adhesive, and consult with manufacturer before installing outside this temperature range.
   2. Prepare joints and install seals in accordance with manufacturer's written recommendations.
   3. Remove loose materials and foreign matter that could impair adhesion.
   4. When installing over existing non-functioning sealant, remove portions of existing installation that protrude beyond surface; install backing tape on surface of existing sealant installation to prevent adhesion of strip seal.

END OF SECTION 07 9100

SECTION 07 9513
EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Expansion joint cover assemblies for floor, wall, ceiling, and soffit surfaces.

1.02 RELATED REQUIREMENTS

A. Section 04 2600 - Single-Wythe Unit Masonry: Placement of joint cover assembly frames in masonry.

B. Section 07 7100 - Roof Specialties: Roof expansion and control joint covers.

C. Section 07 9100 - Preformed Joint Seals: Sealing expansion and control joints using preformed joint seals.

D. Section 09 2116 - Gypsum Board Assemblies: Gypsum board control joint trim.

1.03 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2020.

D. ITS (DIR) - Directory of Listed Products; Current Edition.

E. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Installation Templates: For frames and anchors to be embedded in concrete or masonry, furnish templates to relevant installers; include installation instructions and tolerances.

1.05 SUBMITTALS

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

B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices, available colors and finish, and _____.

C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction, anchorage locations, and _____.

D. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Expansion Joint Cover Assemblies:
   1. EMSEAL Joint Systems, Ltd; _____: www.emseal.com/#sle.
   2. Inpro; _____: www.inprocorp.com/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 EXPANSION JOINT COVER ASSEMBLIES

A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
   1. Joint Dimensions and Configurations: As indicated on drawings.
   2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.

3. Joint Cover Styles: As indicated on drawings.
4. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
5. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.

B. Sliding Cover Plate Type Covers: Provide plate with beveled edges and neat fit that does not collect dirt.

C. Covers In Gypsum Board Assemblies: Provide style with anchoring wings that can be completely covered by joint compound.

D. Covers In Fire Rated Assemblies: Provide cover assembly having fire rating equivalent to that of assembly into which it is installed.
1. Acceptable Evaluation Agencies: UL (DIR) and ITS (DIR).

2.03 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
1. Exposed Finish Outdoors: Natural anodized.
2. Exposed Finish at Floors: Mill finish or natural anodized.
3. Exposed Finish at Walls and Ceilings: Natural anodized.

B. Anchors and Fasteners: As recommended by cover manufacturer.

C. Ferrous Metal Anchors: Galvanized where embedded in concrete or in contact with cementitious materials.

D. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

B. Verify that frames and anchors installed by others are in correct locations and suitable for installation of remainder of assembly.

3.02 INSTALLATION

A. Install components and accessories in accordance with manufacturer's instructions.

B. Align work plumb and level, flush with adjacent surfaces.

C. Rigidly anchor to substrate to prevent misalignment.

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. Galvanized doors and frames at exterior locationsrs.

C. Hollow metal frames for wood doors.

D. Hollow metal borrowed lites glazing frames.

E. Accessories, including glazing and louvers.

F. NOTE: On doors receiving exit devices no universal preps are allowed and the doors shall be prepared specifically for the exit device functions as scheduled.

1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware.

B. Section 09 9113 - Exterior Painting: Field painting.

C. Section 09 9123 - Interior Painting: Field painting.

1.03 ABBREVIATIONS AND ACRONYMS

A. ANSI: American National Standards Institute.

B. HMMA: Hollow Metal Manufacturers Association.

C. NFPA: National Fire Protection Association.

D. SDI: Steel Door Institute.

E. UL: Underwriters Laboratories.

1.04 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2022.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2025.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

F. 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; 2023, with Editorial Revision.

G. 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; 2023.

H. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.

I. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

J. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.

K. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

L. ITS (DIR) - Directory of Listed Products; Current Edition.

M. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

N. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2024.

O. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2024.

P. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.

Q. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

R. UL (DIR) - Online Certifications Directory; Current Edition.

S. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.05 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.
   1. **NOTE**: On doors receiving exit devices no universal preps are allowed and the doors shall be prepared specifically for the exit device functions as scheduled.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.06 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.

1.07 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 MANUFACTURERS

A. Hollow Metal Doors and Frames:
   1. Ceco Door, an Assa Abloy Group company; None - N/A: www.assaabloydss.com/#sle.
   2. Curries, an Assa Abloy Group company; None - N/A: www.assaabloydss.com/#sle.
   3. Fleming Door Products, an Assa Abloy Group company; None - N/A: www.assaabloydss.com/#sle.
   4. Republic Doors, an Allegion brand; None - N/A: www.republicdoor.com/#sle.
   5. Steelcraft, an Allegion brand; None - N/A: www.allegion.com/#sle.
   6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 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. Typical Door Face Sheets: Flush.
   6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturer's standard.

7. 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.
8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.

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.

2.03 HOLLOW METAL DOORS

A. Exterior Doors: Thermally insulated.
1. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
2. Door Thermal Resistance: R-Value of 4.0.
3. Weatherstripping: Refer to Section 08 7100.
4. Door Finish: Factory primed and field finished.

B. Interior Doors, Non-Fire Rated:
1. Door Finish: Factory primed and field finished.

C. Fire-Rated Doors:
1. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
2. Provide units listed and labeled by UL (DIR) or ITS (DIR).
a. Attach fire rating label to each fire rated unit.

2.04 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: Full profile/continuously welded type.
1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
3. Weatherstripping: Separate, see Section 08 7100.
4. At exterior CMU openings to bridge gap between CMU veneer and the core concrete of the ICF provide 8 3/4 inch wide frames.

D. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
1. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.

E. Door Frames, Fire-Rated: Full profile/continuously welded type.
1. Fire Rating: Same as door, labeled.
2. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.

F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

G. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

H. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

I. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.

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. Louvers: Roll formed steel with overlapping frame; finish same as door components ; factory-installed.
   1. Style: Sightproof inverted V blade.
   2. Fasteners: Exposed or concealed fasteners.

B. Glazing: As specified in Section 08 8000, factory installed.

C. Removable Stops: Rolled steel bar, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.

D. 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.

E. Silencers: Resilient rubber, 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.

F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

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. Install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

E. Install door hardware as specified in Section 08 7100.

F. Coordinate installation of electrical connections to electrical hardware items.

3.04 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.05 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION 08 1113

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.

B. **NOTE**: On doors receiving exit devices no universal preps are allowed and the doors shall be prepared specifically for the exit device functions as scheduled.

1.02 RELATED REQUIREMENTS

A. Section 08 1113 - Hollow Metal Doors and Frames.

B. Section 08 7100 - Door Hardware.

C. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

A. AWI (QCP) - Quality Certification Program; Current Edition.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

D. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.

E. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

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, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
   1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
   2. **NOTE**: On doors receiving exit devices no universal preps are allowed and the doors shall be prepared specifically for the exit device functions as scheduled.

D. Samples: Submit two samples of door veneer, 6 x 6 inch in size illustrating wood grain, stain color, and sheen.

E. Test Reports: Show compliance with specified requirements for the following:
   1. Fire ratings for fire doors

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. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

C. Woodwork Quality Assurance Program:
   1. Comply with AWI (QCP) woodwork association quality assurance service/program in accordance with requirements for work specified in this section; www.awiqcp.org/#sle.
   2. Provide labels indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.

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.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Eggers Industries: www.eggersindustries.com/#sle.
   2. Graham Wood Doors: www.grahamdoors.com/#sle.
   3. Marshfield DoorSystems, Inc: www.marshfielddoors.com/#sle.
   4. VT Industries, Inc; www.vtindustries.com.
   5. Weyerhaeuser; www.weyerhauyser.com
   6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS AND PANELS

A. Doors: See drawings for locations and additional requirements.
   1. Quality Standard: Premium Grade, Extra Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
   2. Wood Veneer Faced Doors: 5-ply or 7-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) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
   3. Wood veneer facing with factory transparent finish as indicated on drawings.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), 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, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face; wood grain to run horizontally. Wood grain to be installed in a horizontal direction.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:

C. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.

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.

F. Provide edge clearances in accordance with the quality standard specified.

2.06 FINISHES - WOOD VENEER DOORS

A. Factory finish doors in accordance with approved sample.

2.07 ACCESSORIES

A. Hollow Metal Door Frames: See Section 08 1113.

B. Glazing: See Section 08 8000.

C. Glazing Stops: Wood with metal clips for rated doors, butted corners; prepared for countersink style tamper proof screws.

D. 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.

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. Coordinate installation of glazing.

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.

END OF SECTION 08 1416

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SECTION 08 3100
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Ceiling-mounted access units.

B. Wall- and ceiling-mounted access units.

1.02 SUBMITTALS

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

B. Shop Drawings: Indicate exact position of each access door and/or panel unit.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

A. Wall-Mounted Units with Return Air Grille:
   1. Location: As indicated on drawings.
   2. Panel Material: Aluminum extrusions with gypsum board inlay.
   3. Size: 12 by 12 inches.
   4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
   5. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.
   6. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
   7. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.

B. Fire-Rated Wall-Mounted Units:
   1. Location: As indicated on drawings.
   2. Wall Fire-Rating: As indicated on drawings.
   3. Panel Material: Steel.
   4. Size: 12 by 12 inches.
   5. Door/Panel: Insulated double-surface panel, with tool-operated spring or cam lock and no handle.

C. Ceiling-Mounted Units with Return Air Grille:
   1. Location: As indicated on drawings.
   2. Panel Material: Aluminum extrusion with gypsum board inlay.
   3. Size - Lay-In Grid Ceilings: To match module of ceiling grid.
   4. Size - Other Ceilings: 12 by 12 inches.
   5. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

D. Fire-Rated Ceiling-Mounted Units:
   1. Location: As indicated on drawings.
   2. Ceiling Fire-Rating: As indicated on drawings.
   3. Panel Material: Steel.
   4. Size: 12 by 12 inches.
   5. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings are correctly sized and located.

B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to proceeding with this work.

B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.03 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings, and secure units rigidly in place.

C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION 08 3100

SECTION 08 5123
STEEL WINDOWS

PART 2 PRODUCTS

END OF SECTION 08 5123

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SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 "General Requirements" sections for Allowances, Alternates, Owner Furnished Contractor Installed, Project Management and Coordination.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
   a. "Metal Doors and Frames"
   b. "Flush Wood Doors"
   c. "Interior Aluminum Doors and Frames"
   d. "Aluminum-Framed Entrances and Storefronts"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
   a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
   b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
   a. Wiring Diagrams: For power, signal, and control wiring and including:
      1) Details of interface of electrified door hardware and building safety and security systems.
      2) Schematic diagram of systems that interface with electrified door hardware.
      3) Point-to-point wiring.
      4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
   a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule:
   a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.

b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
c. Indicate complete designations of each item required for each opening, include:
   1) Door Index: door number, heading number, and Architect's hardware set number.
   2) Quantity, type, style, function, size, and finish of each hardware item.
   3) Name and manufacturer of each item.
   4) Fastenings and other pertinent information.
   5) Location of each hardware set cross-referenced to indications on Drawings.
   6) Explanation of all abbreviations, symbols, and codes contained in schedule.
   7) Mounting locations for hardware.
   8) Door and frame sizes and materials.
   9) Degree of door swing and handing.
   10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.

5. Key Schedule:
   a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
   b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
   c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
   d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
   e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
   f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:
   a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
   b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
   a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
   b. Catalog pages for each product.
   c. Final approved hardware schedule edited to reflect conditions as installed.
   d. Final keying schedule
   e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
   f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
   a. Fire door assemblies, in compliance with NFPA 80.
   b. Required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
   a. For door hardware: DHI certified AHC or DHC.
   b. Can provide installation and technical data to Architect and other related subcontractors.
   c. Can inspect and verify components are in working order upon completion of installation.
   d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.

4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
   a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
   b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

2. Smoke and Draft Control Door Assemblies:
   a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
   b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

3. Electrified Door Hardware
   a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

4. Accessibility Requirements:
   a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference
   a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
      1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
      2) Preliminary key system schematic diagram.
      3) Requirements for key control system.
      4) Requirements for access control.
      5) Address for delivery of keys.
   b. Keying meeting is required with Owner to verify all key types, keyways, and system prior to construction.

2. Pre-installation Conference
   a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   b. Inspect and discuss preparatory work performed by other trades.
   c. Inspect and discuss electrical roughing-in for electrified door hardware.
   d. Review sequence of operation for each type of electrified door hardware.
   e. Review required testing, inspecting, and certifying procedures.
   f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:
   a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.

C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.

D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
   a. Mechanical Warranty
      1) Locks
         a) Schlage ND Series: 10 years
         b) Schlage L Series: 10 years
      2) Exit Devices
         a) Von Duprin: 10 years
      3) Closers
         a) LCN 4000 Series: 30 years
      4) Automatic Operators
         a) LCN: 2 years
   b. Electrical Warranty
      1) Exit Devices
         a) Von Duprin: 3 year

1.08 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."

   1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.

B. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.

C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.

D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

   1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer’s recognized installation standards for application intended.
   2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
   3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with “Metal Doors and Frames”, “Flush Wood Doors”, “Stile and Rail Wood Doors” to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

   1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

C. Cable and Connectors:

   1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
   2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
   3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Ives 5BB series to match standards

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
   a. Exterior: Refer to the paragraph of continuous hinges
   b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
   a. Exterior: Refer to the paragraph of continuous hinges
   b. Interior: Refer to the paragraph of continuous hinges

5. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
6. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Refer to the paragraph of continuous
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins

8. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives to match standards

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.

7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:

1. Scheduled Manufacturer and Product:
   a. Von Duprin EPT-10

2. Acceptable Manufacturers and Products:
   a. Per Architect/Owner's approval

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.06 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Per Architect/Owner's approval

B. Requirements:

1. Avoid automatic flush bolts and coordinators where possible. Owner to review and approve. Provide manual flush bolts at mechanical rooms and storerooms, top bolts only.
2. Provide manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.07 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Schlage L9000 series to match standards

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.

2. Indicators: Where specified, provide indicator window measuring a minimum 2-3/5-inch x 3/5 inch with 180-degree visibility. Provide messages color-coded using ANSI Z535 Safety Red with full text and/or symbols, as scheduled, for easy visibility. When applicable allows for lock status indication on both sides of the door.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
7. Provide motor based electrified locksets that comply with the following requirements:
   a. Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
   b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case.
   c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
   d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate “hot levers” in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
   e. Connections – provide quick-connect Molex system standard.

8. (KEY OVERRIDE OPTION WHEN XL13-439 IS SPECIFIED IN HARDWARE SETS) Provide locks with a key override feature built into the chassis that allows the outside key to retract the deadbolt and/or latchbolt, overriding the inside thumbturn when it is being held in the locked position.
9. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
   a. Vandlgard: Prohibited.
   b. Lever Design: Schlage 06A.

2.08 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Schlage ND series to match standards

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide escutcheon with lock status indicator window on top of lockset rose:
   a. Escutcheon height (including rose) 6.05 inches high by 3.68 inches wide.
   b. Indicator window measuring a minimum 3.52-inch by .60 inch with 1.92 square-inches of front facing viewing area and 180-degree visibility with a total of .236 square-inches of total viewable area.
   c. Provide snap-in serviceable window to prevent tampering. Lock must function if indicator is compromised.

d. Provide messages color-coded with full text and symbol, as scheduled, for easy visibility.
e. Unlocked and Unoccupied message will display on white background, and Locked and Occupied message will display on red background.

3. Cylinders: Refer to "KEYING" article, herein.
4. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
5. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
6. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
7. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
8. Provide electrified options as scheduled in the hardware sets.
9. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
   a. Vandlgard: Prohibited.
   b. Lever Design: Schlage Rhodes.

2.09 DEADBOLTS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Schlage B500 Series to match standards

B. Requirements:

1. Provide grade 2 deadbolt series conforming to ANSI/BHMA A156.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide deadbolts with standard 2-3/4 inches (70 mm) backset. Provide 2-3/8 inches (60 mm) where noted or if door or frame detail requires. Provide deadbolt with full 1-inch (25 mm) throw, constructed of steel alloy.
4. Provide manufacturer's standard strike.
5. Lock Status Indicator Trim: Where specified, provide escutcheon with lock status indicator widow.
   a. Escutcheon height 4.125 inches, width 2.54 inches. Projection 1.32 inches on thumbturn side and 1.28 inches on cylinder side.
   b. Unlocked and Unoccupied message will display on white background, and Locked and Occupied message will display on red background.
   c. Provide snap-in serviceable window to prevent tampering. Lock must function if indicator is compromised.
   d. Indicator window to provide 180-degree visibility.

2.10 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Von Duprin 98/35A series to match standards

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.

3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.
17. Special Options:
    a. CVC
        1) Provide cable-actuated concealed vertical latch system in two-point for non-rated or fire rated wood doors up to a 90 minute rating and less bottom latch (LBL) configuration for non-rated or fire rated wood doors up to 20 minute rating. Vertical rods not permitted.
            a) Cable: Stainless steel with abrasive resistant coating. Conduit and core wire ends snap into latch and center slides without use of tools.
            b) Wood Door Prep: Maximum 1 inch x 1.1875 inch x 3.875 inches top latch pocket and 1 inch x 1.1875 inch x 5 inches bottom latch pocket which does not require the use of a metal wrap or edge for non-rated or fire rated wood doors up to a 45 minute rating.
            c) Latchbolts and Blocking Cams: Manufactured from sintered metal low carbon copper- infiltrated steel, with molybdenum disulfide low friction coating.
            d) Top Latchbolt: Minimum 0.38 inch (10 mm) and greater than 90-degree engagement with strike to prevent door and frame separation under high static load.
            e) Bottom Latchbolt: Minimum of 0.44-inch (11 mm) engagement with strike.
            f) Product Cycle Life: 1,000,000 cycles.
            g) Latch Operation: Top and bottom latch operate independently of each other. Top latch fully engages top strike even when bottom latch is compromised. Separate trigger mechanisms not permitted.
            h) Latch release does not require separate trigger mechanism.
            i) Cable and latching system characteristics:
                i. Installed independently of exit device installation, and capable of functioning on door prior to device and trim installation.
                ii. Connected to exit device at single point in steel and aluminum doors, and two points for top and bottom latches in wood doors.

iii. Bottom latch height adjusted, from single point for steel and aluminum doors and two points for wood doors, after system is installed and connected to exit device, while door is hanging
iv. Bottom latch position altered up and down minimum of 2 inches (51 mm) in steel and aluminum doors without additional adjustment. Bottom latch deadlocks in every adjustment position in wood doors.
v. Top and bottom latches in steel and aluminum doors and top latch in wood doors may be removed while door is hanging.

2.11 ELECTRIC STRIKES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Adams Rite 7440 Series

2. Acceptable Manufacturers and Products:
   a. Per Architect/Owner's approval

B. Requirements:

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary resistant that are tested to a minimum endurance test of 1,000,000 cycles.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.12 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer and Product:
   a. Exterior doors: Schlage primus LFIC core system
   b. Interior doors: Schlage classic conventional cylinder
   c. Keyed removable mullion: Schlage classic FSIC core system
   d. Cylinder dogging on devices: Schlage classic conventional cylinder
   e. Keyway: Schlage E and EF

2. Scheduled cylinder types and keyways are for estimating purpose only. Approval from Owner is required prior to material procurement.
3. Acceptable Manufacturers and Products:
   a. No Substitute

B. Requirements:

1. Provide cylinders/cores to match Owner’s existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer’s series as indicated. Refer to “KEYING” article, herein.

2.13 KEYING

A. Scheduled System:

1. New factory registered system:
   a. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Construction Keying:
   a. Temporary Construction Cylinder Keying.
      1) Provide construction cores that permit voiding construction keys without cylinder removal, furnished in accordance with the following requirements.
         a) Split Key or Lost Ball Construction Keying System.
         b) 3 construction control keys, and extractor tools or keys as required to void construction keying.
         c) 12 construction change (day) keys.
      2) Owner or Owner's Representative will void operation of temporary construction keys.
   b. Replaceable Construction Cores.
      1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
         a) 3 construction control keys
         b) 12 construction change (day) keys.
      2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2. Permanent Keying:
   a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
      1) Master Keying system as directed by the Owner.
   b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
   c. Provide keys with the following features:
      1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
      2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
      3) Geographically Exclusive: Where High Security or Security cylinders/cores are indicated, provide nationwide, geographically exclusive key system complying with the following restrictions.
   d. Identification:
      1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
      2) Identification stamping provisions must be approved by the Architect and Owner.
      3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
      4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
      5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
   e. Quantity: Furnish in the following quantities.
      1) Permanent Control Keys: 3.
      2) Master Keys: 6.
      3) Change (Day) Keys: 3 per cylinder/core that is keyed differently
      4) Key Blanks: Quantity as determined in the keying meeting.

2.14 KEY CONTROL SYSTEM

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Telkee

2. Acceptable Manufacturers:
   a. HPC
   b. Lund

B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
   a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
   b. Provide hinged-panel type cabinet for wall mounting.

2.15 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. LCN 4040XP series to match standards

B. Requirements:

1. Provide closers with EDA-Extra Duty Arms at all locations.
2. Provide closers to allow 180-degree swing where possible. Closers are to be mounted on the push sides of the door with EDA arms.
3. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
4. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
5. Cylinder Body: 1-1/2-inch (38 mm) diameter piston with 5/8-inch (16 mm) diameter double heat-treated pinion journal. QR code with a direct link to maintenance instructions.
6. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
7. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards. Provide snap-on cover clip, with plastic covers, that secures cover to spring tube.
8. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck. Provide graphically labelled instructions on the closer body adjacent to each adjustment valve. Provide positive stop on reg valve that prevents reg screw from being backed out.
9. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
10. Pressure Relief Valve (PRV) Technology: Not permitted.
11. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).

12. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.16 ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. LCN 4600 series

2. Acceptable Manufacturers and Products:
   a. Per Architect/Owner's approval

B. Requirements:

1. Provide low energy automatic operator units with hydraulic closer complying with ANSI/BHMA A156.19.
2. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door
4. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.
5. Provide drop plates, brackets, and adapters for arms as required for details.
6. Provide actuator switches and receivers for operation as specified.
7. Provide weather-resistant actuators at exterior applications.
8. Provide key switches with LED's, recommended and approved by manufacturer of automatic operator as required for function described in operation description of hardware group below. Cylinders: Refer to "KEYING" article, herein.
9. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.
10. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

2.17 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Trimco

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.18 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Trimco

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.19 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
   a. Glynn-Johnson

2. Acceptable Manufacturers:
   a. Per Architect/Owner's approval

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.

2.20 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Trimco

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide overhead stops.

2.21 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Zero International

2. Acceptable Manufacturers:
   a. Per Architect/Owner's approval

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.22 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Per Architect/Owner's approval

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.23 MAGNETIC HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. LCN

2. Acceptable Manufacturers:
   a. Per Architect/Owner's approval

B. Requirements:

1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

2.24 FINISHES

A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
4. Installation Guide for Doors and Hardware: DHI TDH-007-20

B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.

C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.

I. Lock Cylinders:

1. Install construction cores to secure building and areas during construction period.
2. Replace construction cores with permanent cores as indicated in keying section.
3. Furnish permanent cores to Owner for installation.

J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
5. Connections to panel interface modules, controllers, and gateways.
6. Testing and labeling wires with Architect's opening number.

K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

L. Continuous Hinges: Re-locate the door and frame fire rating labels where they will remain visible so that the hinge does not cover the label once installed.

M. Door Closers & Auto Operators: Mount closers/operators on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers/operators so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

N. Overhead Stops/Holders: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

O. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

P. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

Q. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

R. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

S. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

T. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items per manufacturer's instructions to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.

C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets:

Cache County School District
SPRING CREEK ELEMENTARY

02.18.2026 OPT0470809 Version V1

Legend:
Link to catalog cut sheet
Electrified Opening

HARDWARE GROUP NO. 01

For use on Door #(s):

3B 3C

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	FACULTY RR	L9485P6 06A 09-544 OS-OCC		626	SCH
1	EA	SURFACE CLOSER	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	SEAL	188S		BK	ZER

HARDWARE GROUP NO. 02

For use on Door #(s):

81 A102C A102F A102G

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80P6D RHO		626	SCH
1	EA	SURFACE CLOSER	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CVX		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE GROUP NO. 03

For use on Door #(s):

87 88 A102A A102B

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	OFFICE LOCK	ND53P6D RHO		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE GROUP NO. 04

For use on Door #(s):

91 92

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PRIV W/OCC IND	ND40S RHO OS-OCC		626	SCH
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	SEAL	188S		BK	ZER

HARDWARE GROUP NO. 05

For use on Door #(s):

A101A

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	ND80P6D RHO		626	SCH
1	EA	ELECTRIC STRIKE	7440 FSE AS REQ'D	✓	630	ADA
1	EA	LOCK GUARD	LG14		630	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	SEAL	188S		BK	ZER
1	EA	CREDENTIAL READER	BY DIV 28	✓	00	TBD
1	EA	REMOTE RELEASE BUTTON	BY DIV 28	✓	00	TBD
1	EA	POWER	BY LOW VOLT VEND	✓	600	TBD

DOOR IS NORMALLY LATCHED AND SECURED
PRESENTING VALID CREDENTIAL, PUSHING RELEASE BUTTON FROM OFFICE RELEASES STRIKE FOR ENTRY OR KEYOVERRIDE
DOOR IS SECURED UPON LOSS OF POWER TO THE STRIKE
FREE EGRESS AT ALL TIMES

HARDWARE GROUP NO. 06

For use on Door #(s):

A101B

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER			FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5			652	IVE
1	EA	STOREROOM LOCK	ND80P6D RHO			626	SCH
1	EA	ELECTRIC STRIKE	7440 FSE AS REQ'D		✓	630	ADA
1	EA	OH STOP	100S			630	GLY
1	EA	SURFACE CLOSER	4040XP REG			689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS			630	IVE
1	EA	SEAL	188S			BK	ZER
1	EA	CREDENTIAL READER	BY DIV 28		✓	00	TBD
1	EA	REMOTE RELEASE BUTTON	BY DIV 28		✓	00	TBD
1	EA	POWER	BY LOW VOLT VEND		✓	600	TBD

DOOR IS NORMALLY LATCHED AND SECURED
PRESENTING VALID CREDENTIAL, PUSHING RELEASE BUTTON FROM OFFICE RELEASES STRIKE FOR ENTRY OR KEYOVERRIDE
DOOR IS SECURED UPON LOSS OF POWER TO THE STRIKE
FREE EGRESS AT ALL TIMES

HARDWARE GROUP NO. 07

For use on Door #(s):

A102

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER			FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP			652	IVE
1	EA	STOREROOM LOCK	ND80P6D RHO			626	SCH
1	EA	ELECTRIC STRIKE	7440 FSE AS REQ'D		✓	630	ADA
1	EA	LOCK GUARD	LG14			630	IVE
1	EA	OH STOP	100S			630	GLY
1	EA	SURFACE CLOSER	4040XP EDA			689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS			630	IVE
1	EA	WALL STOP	WS401/402CVX			626	IVE
1	EA	SEAL	188S			BK	ZER
1	EA	CREDENTIAL READER	BY DIV 28		✓	00	TBD
1	EA	POWER	BY LOW VOLT VEND		✓	600	TBD

DOOR IS NORMALLY LATCHED AND SECURED
PRESENTING VALID CREDENTIAL RELEASES STRIKE FOR ENTRY OR KEYOVERRIDE
DOOR IS SECURED UPON LOSS OF POWER TO THE STRIKE
FREE EGRESS AT ALL TIMES

HARDWARE GROUP NO. 08

For use on Door #(s):

A102D

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	WALL STOP	WS401/402CVX		626	IVE
1	EA	SEAL	188S		BK	ZER

HARDWARE GROUP NO. 09

For use on Door #(s):

A102E

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PRIV W/OCC IND	ND40S RHO OS-OCC		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	SEAL	188S		BK	ZER

HARDWARE GROUP NO. 10

For use on Door #(s):

E100A E100B

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER			FINISH	MFR
2	EA	CONT. HINGE	114XY EPT			628	IVE
2	EA	POWER TRANSFER	EPT10 CON		✓	689	VON
4	EA	WIRE HARNESS	CON-X SIZE AS REQ'D		✓	00	SCH
1	EA	REMOVABLE MULLION	KR4954 STAB			689	VON
1	EA	ELECT PANIC DEV	RX-QEL-98-DT-CON		✓	626	VON
1	EA	ELECT PANIC DEV	RX-QEL-98-NL-CON		✓	626	VON
1	EA	MORTISE CYLINDER	20-059			626	SCH
1	EA	RIM CYLINDER	20-079			626	SCH
1	EA	PRIMUS CORE	20-740-XP			626	SCH
1	EA	PERM CORE	23-030 FOR MULL			626	SCH
2	EA	OH STOP	100S			630	GLY
2	EA	SURFACE CLOSER	4040XP EDA			689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS			630	IVE
1	EA	RAIN DRIP	142AA			AA	ZER
2	SET	WEATHERSTRIP	429A			AA	ZER
1	EA	MULLION SEAL	8780N			BK	ZER
2	EA	DOOR SWEEP	39A			A	ZER
1	EA	THRESHOLD	655A-223			A	ZER
2	EA	STRK MTG BRKT	328SPB			600	ZER
2	EA	CLOSER MTG BRKT	328SPB			600	ZER
1	EA	CREDENTIAL READER	BY DIV 28		✓	00	TBD
2	EA	DOOR POSITION SWITCH	BY DIV 28		✓	00	TBD
1	EA	POWER	BY LOW VOLT VEND		✓	600	TBD

HARDWARE GROUP NO. 11

For use on Door #(s):

E100C E100D

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER			FINISH	MFR
2	EA	CONT. HINGE	114XY			628	IVE
1	EA	FIRE PANIC DEV	9849-EO-F-LBL			626	VON
1	EA	FIRE PANIC DEV	9849-L-BE-F-06-LBLAFL			626	VON
2	EA	SURFACE CLOSER	4040XP EDA			689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS			630	IVE
2	EA	MAGNNETIC HOLDER	SEM7850		✓	689	LCN
1	EA	SEAL	188S			BK	ZER
2	EA	MEETING STYLE	8194A			AA	ZER

ALWAYS FREE INGRESS AND EGRESS

MAGNETIC HOLDERS TIED INTO FIRE ALARM SYSTEM

HARDWARE GROUP NO. 12

For use on Door #(s):

E129

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	CLASSROOM SECURITY	ND78P6D RHO IS-CRS		626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CVX		626	IVE
1	EA	SEAL	188S		BK	ZER

HARDWARE GROUP NO. 13

For use on Door #(s):

E1043

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	ND80P6D RHO		626	SCH
1	EA	SURFACE CLOSER	4040XP SHCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE GROUP NO. 14

For use on Door #(s):

V01A V06A V08A V09A

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER			FINISH	MFR
2	EA	CONT. HINGE	114XY EPT			628	IVE
2	EA	POWER TRANSFER	EPT10 CON		✓	689	VON
4	EA	WIRE HARNESS	CON-X SIZE AS REQ'D		✓	00	SCH
1	EA	REMOVABLE MULLION	KR4954 STAB			689	VON
1	EA	ELECT PANIC DEV	LX-RX-QEL-98-NL-CON		✓	626	VON
1	EA	ELECT PANIC DEV	RX-QEL-98-DT-CON		✓	626	VON
1	EA	MORTISE CYLINDER	20-059			626	SCH
1	EA	RIM CYLINDER	20-079			626	SCH
1	EA	PRIMUS CORE	20-740-XP			626	SCH
1	EA	PERM CORE	23-030 FOR MULL			626	SCH
2	EA	OH STOP	100S			630	GLY
1	EA	SURFACE CLOSER	4040XP EDA			689	LCN
1	EA	SURFACE ADO	4642 WMS		✓	689	LCN
1	EA	WEATHER RING	8310-801			BLK	LCN
2	EA	ACTUATOR, TOUCHLESS	8310-810D		✓	630	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS			630	IVE
1	EA	RAIN DRIP	142AA			AA	ZER
2	SET	WEATHERSTRIP	429A			AA	ZER
1	EA	MULLION SEAL	8780N			BK	ZER
2	EA	DOOR SWEEP	39A			A	ZER
1	EA	THRESHOLD	655A-223			A	ZER
2	EA	STRK MTG BRKT	328SPB			600	ZER
2	EA	CLOSER MTG BRKT	328SPB			600	ZER
1	EA	CREDENTIAL READER	BY DIV 28		✓	00	TBD
2	EA	DOOR POSITION SWITCH	BY DIV 28		✓	00	TBD
1	EA	POWER	BY LOW VOLT VEND		✓	600	TBD

DOOR IS NORMALLY LATCHED AND SECURED
DOOR MAY BE PROGRAMMED TO REMAIN UNLOCKED ON A SCHEDULE THROUGH ACCESS CONTROL SYSTEM
PRESENTING VALID CREDENTIAL TEMPORARILY RETRACTS LATCHBOLT FOR ENTRY WHEN DOOR IS LOCKED
EXTERIOR ACTURATOR IS CONTROLLED BY ACCESS CONTROL SYSTEM; INTERIOR ACTUATOR IS ALWAYS ACTIVE
DOOR IS MONITORED THROUGH ACCESS CONTROL OR SECURITY SYSTEM
DOOR IS SECURED UPON LOSS OF POWER TO THE DEVICE
FREE EGRESS AT ALL TIMES

HARDWARE GROUP NO. 15

For use on Door #(s):

V01B V06B V08B V09B V10

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER			FINISH	MFR
2	EA	CONT. HINGE	114XY EPT			628	IVE
2	EA	POWER TRANSFER	EPT10 CON		✓	689	VON
4	EA	WIRE HARNESS	CON-X SIZE AS REQ'D		✓	00	SCH
1	EA	REMOVABLE MULLION	KR4954 STAB			689	VON
1	EA	ELECT PANIC DEV	LX-RX-QEL-98-NL-CON		✓	626	VON
1	EA	ELECT PANIC DEV	RX-QEL-98-DT-CON		✓	626	VON
1	EA	MORTISE CYLINDER	20-059			626	SCH
1	EA	RIM CYLINDER	20-079			626	SCH
1	EA	PRIMUS CORE	20-740-XP			626	SCH
1	EA	PERM CORE	23-030 FOR MULL			626	SCH
1	EA	OH STOP	100S			630	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH			689	LCN
1	EA	SURFACE ADO	4642 WMS		✓	689	LCN
2	EA	ACTUATOR, TOUCHLESS	8310-810D		✓	630	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS			630	IVE
1	EA	MULLION SEAL	8780N			BK	ZER
2	EA	SILENCER	SR64			GRY	IVE
1	EA	CREDENTIAL READER	BY DIV 28		✓	00	TBD
2	EA	DOOR POSITION SWITCH	BY DIV 28		✓	00	TBD
1	EA	POWER	BY LOW VOLT VEND		✓	600	TBD

DOOR IS NORMALLY LATCHED AND SECURED
DOOR MAY BE PROGRAMMED TO REMAIN UNLOCKED ON A SCHEDULE THROUGH ACCESS CONTROL SYSTEM
PRESENTING VALID CREDENTIAL TEMPORARILY RETRACTS LATCHBOLT FOR ENTRY WHEN DOOR IS LOCKED
EXTERIOR ACTURATOR IS CONTROLLED BY ACCESS CONTROL SYSTEM; INTERIOR ACTUATOR IS ALWAYS ACTIVE
DOOR IS MONITORED THROUGH ACCESS CONTROL OR SECURITY SYSTEM
DOOR IS SECURED UPON LOSS OF POWER TO THE DEVICE
FREE EGRESS AT ALL TIMES

HARDWARE GROUP NO. 16

For use on Door #(s):

V07A

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	114XY		628	IVE
1	EA	PANIC HARDWARE	LD-98-EO		626	VON
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	SET	WEATHERSTRIP	429A		AA	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-223		A	ZER
1	EA	STRK MTG BRKT	328SPB		600	ZER
1	EA	CLOSER MTG BRKT	328SPB		600	ZER

HARDWARE GROUP NO. 17

For use on Door #(s):

V07B

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	114XY		628	IVE
1	EA	PANIC HARDWARE	LD-98-EO		626	VON
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS18S		BLK	IVE
1	EA	SEAL	188S		BK	ZER

END OF SECTION

SECTION 08 8800
SPECIAL FUNCTION GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Laminated security glazing units.

1.02 REFERENCE STANDARDS

A. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).

B. ASTM C1036 - Standard Specification for Flat Glass; 2021.

C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

D. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.

E. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.

F. ASTM F3561 - Standard Test Method for Forced-Entry-Resistance of Fenestration Systems After Simulated Active Shooter Attack; 2023.

G. CPSC 16CFR-1201 - Safety Standard for Architectural Glazing Materials; 2016.

1.03 SUBMITTALS

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

B. Product Data on Insulating Glass Unit Glazing Types: Provide structural, physical, and environmental characteristics, size limitations, special handling, and installation requirements.

C. Certificate: Certify that products of this section meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.

B. Fabricator Qualifications: Certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.

1. Minimum of 5 years' experience manuafacturing sealed insulating glass units meeting ASTM E2190.
2. Minimum of five years' experience manufacturing Laminated glass units meeting ASTM C1172 and CPSC 16CFR-1201

C. Installer Qualifications: Company specializing in performing work of type specified and with at least five years documented experiencemeeting ASTM E2190.

1.05 MOCK-UPS

A. See Section 01 4000 - Quality Requirements for additional requirements.

B. Mock-ups may remain as part of work.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Laminated Glass: Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Security Glass Manufacturers:

2.02 LAMINATED SECURITY GLAZING UNITS

A. Type SG-1 - Security Glazing: Laminated glass, multi-ply.
   1. Tint: Clear.
   2. Thickness: 1-1/4 inches.
   3. Outer Lite: Heat-strengthened glass.
   4. Interlayer, Outboard Side: Polycarbonate, thickness as required to meet performance criteria.
   5. Outer Middle Lite: Annealed glass.
   6. Interlayer, Middle Layer: Polycarbonate, thickness as required to meet performance criteria.
   7. Inner Middle Lite: Annealed glass.
   8. Interlayer, Inboard Side: Polycarbonate, thickness as required to meet performance criteria.
   9. Inside Lite: Polycarbonate.
   10. Performance Criteria:
      a. Forced Entry-resistence (active shooter): Meet or exceed ASTM F3561
      b. Additional compliance standards: ANSI Z97.1, ASTM C1036, ASTM C1172 ASTM C1048.
   11. Thermal Transmittance (U-value), Summer - Center of Glass: _____, nominal.
   12. Glazing Method: As required to meet performance criteria.
   13. Manufacturers:
      a. Ballistic Glass and Armor; SchoolSafe Standard: www.ballisticglassandarmor.com.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that minimum required face and edge clearances are provided.

C. Verify that surfaces of glazing channels or recesses are clean and free of obstructions that impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

D. Verify effective sealing of joints between glass framing members.

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 accordance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

3.04 INSTALLATION - DRY GLAZING METHOD, GASKET GLAZING

A. Application: Set glazing infills from either exterior or interior of building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - WET GLAZING METHOD, SEALANT AND SEALANT

A. Application - Exterior Glazed: Set glazing infills from exterior of 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 on both sides at 24-inch intervals, 1/4 inch below sight line.

D. Fill gaps between glazing and stops with _____ 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 air and vapor seal.

E. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.06 INSTALLATION - WET/DRY GLAZING METHOD, TAPE AND SEALANT

A. Application - Interior Glazed: Set glazing infills from interior of building.

B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

E. Install removable stops with spacer shims inserted between glazing and applied stops at 24-inch intervals, 1/4 inch below sight line.

F. Fill gaps between pane and applied stop with _____ sealant to depth equal to bite on glazing, to uniform and level line.

G. Carefully trim protruding tape with knife.

3.07 INSTALLATION - BUTT JOINT GLAZING METHOD, SEALANT ONLY

A. Application - Exterior Glazed: Set glazing infills from exterior side of building.

B. Temporarily brace glass in position for duration of glazing process; mask edges of glass at adjoining glass edges and between glass edges and framing members.

C. Temporarily secure small-diameter nonadhering foamed rod on back side of joint.

D. Apply sealant to open side of joint in continuous operation; thoroughly fill joint without displacing foam rod, and then tool sealant surface smooth to concave profile.

E. Permit sealant to cure, remove foam backer rod, apply sealant to opposite side, and tool smooth to concave profile.

F. Remove masking tape.

3.08 CLEANING

A. Remove excess glazing materials from finished 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.

3.09 PROTECTION

A. Protect installed glass from damage during construction.

B. Protect installed glass from contact with contaminating substances resulting from construction operations.

C. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents, and vandalism.

END OF SECTION 08 8800

SECTION 08 8000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Insulating glass units.

B. Glazing units.

C. Glazing compounds.

1.02 RELATED REQUIREMENTS

A. Section 07 2500 - Weather Barriers.

B. Section 07 9200 - Joint Sealants: Sealants for other than glazing purposes.

C. Section 08 1113 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.

D. Section 08 1416 - Flush Wood Doors: Glazed lites in doors.

E. Section 08 3200 - Sliding Glass Doors: Glazing provided by door manufacturer.

F. Section 08 4229 - Automatic Entrances: Glazing provided as part of door assembly.

G. Section 08 4313 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.

H. Section 10 2800 - Toilet, Bath, and Laundry Accessories: Mirrors.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

F. ASTM C1036 - Standard Specification for Flat Glass; 2021.

G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

H. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).

I. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.

J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

K. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2024.

L. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.

M. GANA (SM) - GANA Sealant Manual; 2008.

N. ITS (DIR) - Directory of Listed Products; Current Edition.

O. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2023.

P. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.

Q. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2023.

R. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.05 SUBMITTALS

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

B. Product Data on Insulating Glass Unit, Glazing Unit, and Plastic Film Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. Samples: Submit one samples 12 by 12 inch in size of glass units, showing coloration.

E. Samples: Submit 2 inch long bead of glazing sealant, color as selected.

F. Certificate: Certify that products of this section meet or exceed specified requirements.

G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

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 work of the type specified and with at least three years documented experience.

1.07 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.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Float Glass Manufacturers:
   1. Guardian Glass, LLC; _____: www.guardianglass.com/#sle.
   2. Pilkington North America Inc; _____: www.pilkington.com/na/#sle.
   3. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.

B. Mirrored Glass Manufacturers:
   1. Pilkington North America Inc; Pilkington Mirropane Transparent Mirror: www.pilkington.com/na/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 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. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7
4. 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.
5. 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:
a. Water-Resistive Barriers: See Section 07 2500.
2. To maintain a continuous vapor retarder and/or air barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.

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 6.3 computer program.
2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 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. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
5. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

2.04 INSULATING GLASS UNITS

A. Manufacturers:
1. Glass: Any of the manufacturers specified for float glass.

B. 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) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
3. Metal-Edge Spacers: Aluminum, bent and soldered corners.
4. Spacer Color: Bronze.
5. Edge Seal:
a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
6. Color: Black.
7. Purge interpane space with dry air, hermetically sealed.
8. Capillary Tubes: Provide tubes from air space for insulating glass units without inert type gas that have a change of altitude greater than 2500 feet between point of fabrication and point of installation to permit pressure equalization of air space.

a. Breather Tubes: Seal or crimp breather tubes upon installation in accordance with insulating glass fabricator's requirements.
b. Inert gas may be installed in the field into air space in accordance with insulating glass fabricator's and installer's requirements.

C. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
2. Space between lites filled with air.
3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
a. Tint: Clear.
b. Coating: Self-cleaning type, on #1 surface.
c. Coating: Low-E (passive type), on #2 surface.
4. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
a. Tint: Clear.
5. Total Thickness: 1 inch.
6. Thermal Transmittance (U-Value), Summer - Center of Glass: .26, nominal.
7. Visible Light Transmittance (VLT): 32% to 64% percent, nominal.
8. Solar Heat Gain Coefficient (SHGC): 0.19 to 0.27, nominal.

D. Type IG-3 - Insulating Glass Units: Spandrel glazing.
1. Applications: Exterior spandrel glazing unless otherwise indicated.
2. Space between lites filled with air.
3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
a. Tint: Clear.
b. Coating: Same as on vision units, on #2 surface.
4. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick.
a. Tint: Clear.
5. Total Thickness: 1 inch.
6. Thermal Transmittance (U-Value), Summer - Center of Glass: _____, nominal.

E. Type IG-5 - Insulating Glass Units: Safety glazing.
1. Applications:
a. Glazed lites in exterior doors.
b. Glazed sidelights and panels next to doors.
c. Other locations required by applicable federal, state, and local codes and regulations.
d. Other locations indicated on drawings.
2. Space between lites filled with air.
3. Glass Type: Same as Type IG-1 except use fully tempered float glass for both outboard and inboard lites.
4. Tint: Clear.
5. Total Thickness: 1 inch.
6. Thermal Transmittance (U-Value), Summer - Center of Glass: .26, nominal.
7. Visible Light Transmittance (VLT): 32% to 64% percent, nominal.
8. Solar Heat Gain Coefficient (SHGC): 0.19 to 0.27, nominal.
9. Visible Light Reflectance, Outside: 64 percent, nominal.

F. Type IG-6 - Insulating Glass Units: Obscured glass and Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated. To be installed at exterior windows of toilet rooms and locker rooms.
2. Space between lites filled with air.
3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
a. Tint: Clear.
b. Coating: Self-cleaning type, on #1 surface.
c. Coating: Low-E (passive type), on #2 surface.
4. Inboard Lite: Obscured float glass, 1/4 inch thick, minimum.
a. Tint: Clear.

5. Total Thickness: 1 inch.
6. Thermal Transmittance (U-Value), Summer - Center of Glass: .26, nominal.
7. Visible Light Transmittance (VLT): 32% to 64% percent, nominal.
8. Solar Heat Gain Coefficient (SHGC): 0.19 to 0.27, nominal.

2.05 BASIS OF DESIGN - INSULATING GLASS UNITS

A. Basis of Design - Insulating Glass Units: Vision glazing, with low-e coating.
1. Applications: Exterior insulating glass glazing unless otherwise indicated.
2. Space between lites filled with air.
3. Total Thickness: 1 inch.
4. Visible Light Transmittance (VLT): 32% to 64% percent, nominal.
5. Solar Heat Gain Coefficient (SHGC): 0.19 to 0.27, nominal.
6. Visible Light Reflectance, Outside: 64 percent, nominal.
7. Glazing Method: Dry glazing method, gasket glazing.
8. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
9. Spacer Color: Black.
10. Edge Seal:
11. Color: Black.
12. Purge interpane space with dry air, hermetically sealed.
13. Basis of Design - Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
14. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
    a. Low-E Coating: Vitro Architectural Glass (formerly PPG Glass) Solarban 70 glass on #2 surface.
    b. Glass: Clear.
15. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick.
16. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of another acceptable manufacturer.
17. Substitution Procedures: See Section 01 6000 - Product Requirements.

2.06 GLAZING UNITS

A. Type G-2 - Monolithic Interior Vision Glazing:
1. Applications: Interior glazing unless otherwise indicated.
2. Glass Type: Annealed float glass.
3. Tint: Clear.
4. Thickness: 1/4 inch, nominal.

B. Type G-3 - Monolithic Safety Glazing: Non-fire-rated.
1. Applications:
    a. Glazed lites in doors, except fire doors.
    b. Glazed sidelights to doors, except in fire-rated walls and partitions.
    c. Other locations required by applicable federal, state, and local codes and regulations.
    d. Other locations indicated on drawings.
2. Glass Type: Fully tempered safety glass as specified.
3. Tint: Clear.
4. Thickness: 1/4 inch, nominal.
5. Manufacturers:
    a. Capital Glass; www.capitolglassco.com.
    b. Substitutions: See Section 01 6000 - Product Requirements.

C. Type M-1 - Transparent One-Way Mirror: Mirror quality float glass with pyrolytic (hard coat) type coating located on high light level surface of glass; ASTM C1376.
1. Applications: Locations as indicated on drawings.

2. Thickness: 1/4 inch.
3. Glass Tint: Clear .
4. Glass Type: Fully tempered.
5. Manufacturers:
   a. Pilkington North America Inc; Pilkington Mirropane Transparent Mirror: www.pilkington.com/na/#sle.
   b. Substitutions: See Section 01 6000 - Product Requirements.

2.07 GLAZING COMPOUNDS

A. Type GC-2 - 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. Type GC-5 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; _____ color.

C. Manufacturers:
   1. Dow Corning Corporation: www.dowcorning.com/construction/#sle.Dow Corning Corporation: www.dowcorning.com/construction/#sle.
   2. Tremco Commercial Sealants & Waterproofing; Proglaze: www.tremcosealants.com/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

2.08 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. Continuous by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
   1. Width: As required for application.
   2. Thickness: As required for application.
   3. Spacer Rod Diameter: As required for application.

D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

E. 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 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.

C. Verify that sealing between joints of glass framing members has been completed effectively.

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. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

D. 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 - DRY GLAZING METHOD (GASKET GLAZING)

A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - WET/DRY GLAZING METHOD (PREFORMED TAPE AND SEALANT)

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.

C. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

D. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

E. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

F. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.

   1. Place glazing tape on glazing pane of unit with tape flush with sight line.

G. Fill gap between glazing and stop with _____ type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.

H. Apply cap bead of _____ type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.06 INSTALLATION - WET/DRY GLAZING METHOD (TAPE AND SEALANT)

A. Application - Interior Glazed: Set glazing infills from the interior of the building.

B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

E. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.

F. Fill gaps between pane and applied stop with _____ type sealant to depth equal to bite on glazing, to uniform and level line.

G. Carefully trim protruding tape with knife.

3.07 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.

3.08 PROTECTION

A. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION 08 8000

SECTION 08 8300
MIRRORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass mirrors.
   1. Annealed float glass.

1.02 REFERENCE STANDARDS

A. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

B. ASTM C1036 - Standard Specification for Flat Glass; 2021.

C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).

E. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2024.

1.03 SUBMITTALS

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

B. Product Data on Mirror Types: Submit structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

1.04 QUALITY ASSURANCE

A. Fabricate, store, transport, receive, install, and clean mirrors in accordance with manufacturer's recommendations.

1.05 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.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

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: Clear, annealed float glass; ASTM C1036, with copper and silver coatings, and protective overcoating.
   1. Thickness: 1/4 inch.
   2. Edges: Bevelled.
   3. Size: As indicated on drawings.

2.02 GLAZING COMPOUNDS

A. Polysulfide Sealant: ASTM C920, Type M, Grade NS, Class 25, Uses M and A ; two component; chemical curing, non-sagging type; cured Shore A hardness of 15 to 25; color as selected.

2.03 ACCESSORIES

A. Mirror Attachment Accessories: Stainless steel clips.

B. Mirror Adhesive: Silicone pre-polymer based, chemically compatible with mirror coating and wall substrate.
   1. Volatile Organic Content (VOC): Less than 7 percent by weight.

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 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

3.03 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. Frameless Mirrors: Set mirrors in proper place with adhesive, applied in accordance with adhesive manufacturer's instructions.

E. Weight Room
   1. Install mirrors butt joined (frameless installation) to provide a continuous array.

3.04 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 08 8300

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Acoustic sound putty packs

B. Gypsum sheathing.

C. Gypsum wallboard.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

C. Section 07 2100 - Thermal Insulation: Acoustic insulation.

D. Section 07 2500 - Weather Barriers: Water-resistive barrier over sheathing.

E. Section 07 8400 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.

F. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

1.03 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2020).

B. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.

C. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015, with Errata (2020).

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

E. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.

F. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2023.

G. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.

H. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018 (Reapproved 2023).

I. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

J. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2023.

K. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

L. GA-216 - Application and Finishing of Gypsum Panel Products; 2021.

M. GA-600 - Fire Resistance and Sound Control Design Manual; 2021.

1.04 SUBMITTALS

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

B. Product Data:

1. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum five years of experience.

PART 2 PRODUCTS

2.01 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; None - N/A: www.clarkdietrich.com/#sle.
   2. Jaimes Industries; None - N/A: www.jaimesind.com/#sle.
   3. Marino; None - N/A: www.marinoware.com/#sle.
   4. Phillips Manufacturing Co; None - N/A: www.phillipsmfg.com/#sle.
   5. SCAFCO Corporation; None - N/A: www.scafco.com/#sle.
   6. Steel Construction Systems; None - N/A: www.steelconsystems.com/#sle.
   7. Substitutions: See Section 01 6000 - Product Requirements.

C. 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 as listed in ICC Evaluation Service for use in ESR-1042 fire-rated and sound rated at head of partition joint systems indicated on drawings.
   4. Deflection, Sound, and Firestop Track:
      a. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-rating of the wall assembly.

2.02 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. American Gypsum Company; None - N/A: www.americangypsum.com/#sle.
   2. CertainTeed Corporation; None - N/A: www.certainteed.com/#sle.
   3. Continental Building Products; None - N/A: www.continental-bp.com/#sle.
   4. Georgia-Pacific Gypsum; None - N/A: www.gpgypsum.com/#sle.
   5. National Gypsum Company; None - N/A: www.nationalgypsum.com/#sle.
   6. PABCO Gypsum; None - N/A: www.pabcogypsum.com/#sle.
   7. USG Corporation; None - N/A: www.usg.com/#sle.
   8. Substitutions: See Section 01 6000 - Product Requirements.

B. Impact Resistant Wallboard:
   1. Application: Install at wood and metal shops, drama, and weight room.
   2. Surface Abrasion: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
   3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
   4. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
   5. Hard Body Impact: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
   6. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   7. Type: Fire-resistance-rated Type X, UL or WH listed.
   8. Thickness: 5/8 inch.
   9. Edges: Tapered.

C. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
   1. Application: at all window jambs and sills, restrooms, and within 2 feet of all plumbing fixtures including drinking fountains or electric water coolers.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   4. Type X Thickness: 5/8 inch.
   5. Edges: Tapered.
   6. Products:
      a. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Fire-Shield Gypsum Board: www.goldbondbuilding.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

D. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: ceilings in wet areas, unless otherwise indicated.
   2. Thickness: 5/8 inch.
   3. Edges: Tapered.

E. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
   1. Application: Exterior sheathing, unless otherwise indicated.
   2. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
   3. Core Type: Regular.
   4. Regular Board Thickness: 1/2 inch.
   5. Edges: Square.

F. Exterior Soffit Board: Exterior gypsum soffit board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Ceilings and soffits in protected exterior areas, unless otherwise indicated.
   2. Types: Regular, in locations indicated.
   3. Regular Type Thickness: 5/8 inch.
   4. Edges: Tapered.

G. Roof Cover Board
   1. Application: Parapets, unless otherwise indicated.
   2. Type Thickness: 5/8 inch
   3. Products:
      a. Georgia-Pacific Gypsum; Densdeck Prime, www.gpgypsum.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements
   4. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion- resistance provisions in FM Global 4470, designed for fastening substrate board to roof deck.

2.03 GYPSUM BOARD ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 3-1/2" inch.

B. Acoustic Putty Packs installed at back boxes in sound rated walls and at interior of exterior fured walls. Products by 3M, Hilti, or equivilent.

C. Water-Resistive Barrier: See Section 07 2500.

D. Beads, Joint Accessories, and Other Trim: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
   1. Corner Beads: Low profile, for 90 degree outside corners.
   2. Expansion Joints:
      a. Type: V-shaped metal with factory-installed protective tape.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 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.

C. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.

D. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

E. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
   1. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistive barrier.

F. Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.

3.03 FINISH AND TEXTURE

A. Finish Level: Level 4

B. Texture: None

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.

END OF SECTION 09 2116

SECTION 09 3000
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Cementitious backer board as tile substrate.

NOTE: SOME PRODUCTS HAVE LONGER LEAD TIMES. CONTRACTOR SHALL SCHEDULE ACCORDINGLY.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.

1.03 REFERENCE STANDARDS

A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2023.

B. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2021.

C. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2023.

D. ANSI A118.5 - American National Standard Specifications for Chemical Resistant Furan Mortars and Grouts for Tile Installation; 1999 (Reaffirmed 2021).

E. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation; 2019.

F. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2023.

G. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2023.

H. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2014 (Reaffirmed 2024).

I. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2022.

J. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products; 2018 (Reapproved 2023).

K. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2025.

1.04 SUBMITTALS

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

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, and setting details.

D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.

E. 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 Tile: 2 percent of each size, color, and surface finish combination, but not less than 1 box of each type.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.

B. Installer Qualifications: Company specializing in performing tile installation, with minimum of five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 7419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

PART 2 PRODUCTS

2.01 TILE

A. Manufacturers: All products by the same manufacturer.
   1. Dal-Tile Corporation: www.daltile.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Ceramic Mosaic Tile: ANSI A137.1 standard grade.
   1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
   2. Size: 2 by 2 inch, nominal.
   3. Shape: Square.
   4. Edges: Cushioned.
   5. Surface Finish: Unglazed.
   6. Color(s): 3 colors installed in a gradient pattern. Colors as indicated on plans.
   7. Trim Units: Matching cove shapes in sizes coordinated with field tile.

C. Glazed Wall Tile: ANSI A137.1 standard grade.
   1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
   2. Size: As indicated on drawings.
   3. Edges: As indicated on drawings..
   4. Surface Finish: _____.
   5. Color(s): Colors from all price groups..
   6. Trim Units: Matching cove shapes in sizes coordinated with field tile.

D. Porcelain Tile: ANSI A137.1 standard grade.
   1. Size: As indicated on drawings.
   2. Color: As indicated on drawings.
   3. Pattern: As indicated on drawings..

2.02 TRIM AND ACCESSORIES

A. Ceramic Trim: Matching cove base ceramic shapes in sizes coordinated with field tile.
   1. Applications:
      a. Open Edges: Schluter Jolly.
      b. Outside Corners: Schluter Quadec
      c. Inside Corners: Jointed.
      d. Floor to Wall Joints: Cove base.
   2. Manufacturers: Same as for tile.

B. Thresholds: Schluter Schiene, Stainless Steel, full width of wall or frame opening; Install schluter so that top is flush with the top of the adjacent finished floor.

1. Applications:
    a. At doorways where tile terminates.
    b. At open edges of floor tile where adjacent finish is a different.

2.03 SETTING MATERIALS

A. Manufacturers:
1. Custom Building Products: www.custombuildingproducts.com/#sle.
2. LATICRETE International, Inc; _____: www.laticrete.com/#sle.
3. MAPEI Corporation; www.mapei.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.

2.04 GROUTS

A. Manufacturers:
1. Custom Building Products: www.custombuildingproducts.com/#sle.
2. LATICRETE International, Inc: www.laticrete.com/#sle.
3. MAPEI Corporation; www.mapei.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Standard Grout: ANSI A118.6 standard cement grout.
1. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
2. Color: As indicated on drawings.

C. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
1. Applications: Bathrooms.
2. Color: As indicated on drawings.

D. Furan Grout: ANSI A118.5 chemical resistant furan resin grout.
1. Color: As indicated on drawings.

2.05 MAINTENANCE MATERIALS

A. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
1. Composition: Water-based colorless silicone.

2.06 ACCESSORY MATERIALS

A. Waterproofing Membraneat suspended floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
1. Crack Resistance: No failure at 1/16-inch gap, minimum; comply with ANSI A118.12.
2. Fluid or Trowel Applied Type:
    a. Material: Synthetic rubber or Acrylic.
    b. Thickness: 25 mils, minimum, dry film thickness.

B. Reinforcing Mesh: 2 by 2 inch size weave of 16/16 wire size; welded fabric, galvanized.

C. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 7/16 inch thick; 2-inch wide coated glass fiber tape for joints and corners.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive tile.

B. Verify wall surfaces are smooth and flat within tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Vacuum clean surfaces and damp clean.

B. Seal substrate surface cracks with filler.

C. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to feather edge.

3.03 INSTALLATION - GENERAL

A. Lay tile to pattern indicated on drawings. Do not interrupt tile pattern through openings.

B. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

C. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

D. Form internal angles square and external angles bullnosed.

E. Install thresholds where indicated on drawings.

F. Sound tile after setting. Replace hollow sounding units.

G. Keep control and expansion joints free of mortar, grout, and adhesive.

H. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

I. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - FLOORS - MORTAR BED METHODS

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method as listed below.
   1. Where epoxy or furan grout is indicated on drawings, but not epoxy or furan bond coat, install in accordance with TCNA (HB) Method F114, with cleavage membrane.

B. Waterproofing Membrane: Install as recommended by manufacturer and as specified in the section in which the product is specified.

3.05 INSTALLATION - WALL TILE

A. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244C, using membrane at toilet rooms, kitchens, locker rooms, and _____.

B. Over gypsum wallboard on wood or metal studs, install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat.

3.06 CLEANING

A. Clean tile and grout surfaces.

3.07 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION 09 3000

SECTION 09 5100
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

C. Gypsum board units.

D. Cementitious wood fiber plank acoustical ceiling

1.02 RELATED REQUIREMENTS

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; 2022.

B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.

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; 2022.

D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

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. Samples: Submit two samples 4 x 4 inch in size illustrating material and finish of acoustical units.

D. Samples: Submit two samples each, 6 inches long, of suspension system main runner.

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 Acoustical Units: Quantity equal to 5 percent of total installed.

1.06 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acoustic Tiles/Panels:
   1. Armstrong World Industries, Inc: www.armstrongceilings.com/#sle.
   2. Certainteed Architectural: www.certainteed.com/ceilings-and-walls/#sle.

3. USG Corporation: www.usg.com/ceilings/#sle.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Suspension Systems:
1. Same as for acoustical units.
2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ACOUSTICAL UNITS

A. Acoustical Units - General: ASTM E1264, Class A.

B. Acoustical Panels Type A: Painted mineral fiber,ASTM E1264 Type III, with the following characteristics:
1. Size: 24 by 48 inches.
2. Thickness: 3/4 inches.
3. Composition: Wet felted.
4. Light Reflectance: .82 percent, determined in accordance with ASTM E1264.
5. NRC Range: 70 to 75, determined in accordance with ASTM E1264.
6. Ceiling Attenuation Class (CAC): 42, determined in accordance with ASTM E1264.
7. Edge: Square.
8. Surface Color: White.
9. Surface Pattern: perforated, small holes and fissured.
10. Suspension System: Exposed grid Type 1.
11. Products:
a. Armstrong; Calla: www.armstrong.com/#sle.
b. Substitutions: See Section 01 6000 - Product Requirements.

C. Acoustical Panels Type B: Painted mineral fiber,ASTM E1264 Type III, with the following characteristics:
1. Size: 24 by 24 inches.
2. Thickness: 3/4 inches.
3. Composition: Wet felted.
4. Light Reflectance: .82 percent, determined in accordance with ASTM E1264.
5. NRC Range: 70 to 75, determined in accordance with ASTM E1264.
6. Ceiling Attenuation Class (CAC): 42, determined in accordance with ASTM E1264.
7. Edge: Square.
8. Surface Color: White.
9. Surface Pattern: Smooth.
10. Suspension System: Exposed grid Type 1.
11. Products:
a. Armstrong; Calla, www.armstrong.com/#sle.
b. Substitutions: See Section 01 6000 - Product Requirements.
12. Location: Administration Areas and Offices

2.03 SUSPENSION SYSTEM(S)

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 Steel Suspension System Type 1: Formed steel, commercial quality cold rolled; heavy-duty.
1. Profile: Tee; 15/16 inch wide face.
2. Construction: Double web.
3. Finish: White painted.
4. Products:
a. USG Donn; Brand DX/DXL26: 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, seismic requirements, and ceiling system flatness requirement specified.

B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.

C. Perimeter Moldings: Same metal and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Locate system on room axis according to reflected plan.

D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.

E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

F. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

G. 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.

H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

J. Do not eccentrically load system or induce rotation of runners.
   1. Use longest practical lengths.
   2. Overlap and rivet corners.

K. Install Tectum® Direct-Attached Ceiling Panels in accordance manufacturer’s installation instructions.

L. For seismic installations follow the requirements of the International Building Code, ASCE 7 and ASTM E580 and in install in accordance with the authorities having jurisdiction.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

G. Where round obstructions occur, provide preformed closures to match perimeter molding.

3.04 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION 09 5100

SECTION 09 6500
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient sheet flooring.

B. Resilient tile flooring.

C. Resilient base.

D. Resilient stair accessories.

E. Recycled rubber resilient flooring

F. Installation accessories.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.

1.03 REFERENCE STANDARDS

A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2025a.

B. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2020.

C. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021 (Reapproved 2025).

D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

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; including sizes, patterns and colors available; and installation instructions.

C. Shop Drawings: Indicate seaming plans and floor patterns.

D. Verification Samples: Submit two samples, 6 by 6 inch in size illustrating color and pattern for each resilient flooring product specified.

E. Sustainable Design Submittal: Submit VOC content documentation for flooring and adhesives.

1.05 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.

1.06 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.

1.07 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 SHEET FLOORING

A. Section 096516.23 - Vinyl Sheet Flooring

2.02 TILE FLOORING

A. Vinyl Tile - Type ____: Solid vinyl with color and pattern throughout thickness.
   1. Manufacturers:
      a. Mannington Commercial; _____: www.manningtoncommercial.com#sle.
      b. Approved 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 ASTM E648 or NFPA 253.
   4. VOC Content Limits: As specified in Section 01 6116.
   5. Wear Layer Thickness: Minimum 20 mil.
   6. Total Thickness: 0.100 inch.
   7. Pattern: as indicated on the drawings.
   8. Color: As indicated on drawings.

2.03 STAIR COVERING

A. Stair Nosings: 1-1/2 inch horizontal return, 1-1/8 inch vertical return, full width of stair tread in one piece.
   1. Manufacturers:
      a. Roppe Corp; See below: www.roppe.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.
   2. Material: Rubber.
   3. Texture: Ribbed.
   4. Color: To be selected by Architect from manufacturer's full range.

2.04 RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TP, rubber, thermoplastic; top set Standard Toe Base.
   1. Manufacturers:
      a. Johnsonite, a Tarkett Company; None - N/A: www.johnsonite.com/#sle.
      b. Mannington Commercial; _____: www.manningtoncommercial.com#sle.
      c. Roppe Corp; None - N/A: www.roppe.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.
   2. Location: As indicated on drawings.
   3. Height: As indicated on drawings.
   4. Thickness: 0.125 inch.
   5. Finish: ___ .
   6. Length: Roll.
   7. Color: As indicated on drawings.
   8. Accessories: Premolded external corners.

2.05 ACCESSORIES

A. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

B. Adhesive for Rubber Flooring:
   1. Manufacturers:

a. ecore Commercial; E-Grip III One-Component Urethane: www.ecorecommercial.com.
b. Substitutions: Section 01 6000 - Product Requirements.

C. Moldings, Transition and Edge Strips: Same material as flooring or where applicable, as indicated on drawings.
1. Manufacturers:
a. Johnsonite: www.johnsonite.com.
b. Roppe Corp;[None - N/A]: www.roppe.com/#sle.
c. Substitutions: See Section 01 6000 - Product Requirements.

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. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.

C. Prohibit traffic until filler is fully cured.

D. Clean substrate.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Fit joints and butt seams tightly.

E. Set flooring in place, press with heavy roller to attain full adhesion.

F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - SHEET FLOORING

A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.

B. Cut sheet at seams in accordance with manufacturer's instructions.

3.05 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.

3.06 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.

3.07 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

3.08 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION 09 6500

SECTION 09 6813
TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet tile, fully adhered fully adhered.

B. Matching roll carpet for direct glue installation on base.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 REFERENCE STANDARDS

A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016 (Reapproved 2021).

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2025a.

C. CRI 104 - Standard for Installation of Commercial Carpet; 2015.

D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

1.04 SUBMITTALS

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

B. Samples: Submit two carpet tiles illustrating backing,color and pattern design for each carpet color selected.

C. Operation and Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

D. 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 15 percent of total installed of each color and pattern installed.

1.05 QUALITY ASSURANCE

A. 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 MANUFACTURERS

A. Tile Carpeting:
   1. Milliken & Company;[____]: www.milliken.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

A. Tile Carpeting, Type Walk-off Carpet: Tufted, manufactured in one color dye lot.
   1. Product: Obex Tile manufactured by Millikin.
   2. Tile Size: 24 by 24 inch, nominal.
   3. Thickness: pile 0.203 inch.
   4. Color: As indicated on drawings.
   5. Pattern: As indicated on drawings.
   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").
8. VOC Content: Comply with Section 01 6116.

2.03 ACCESSORIES

A. Carpet base with hemmed edges:

B. Carpet Tile Adhesive: Recommended by carpet tile manufacturer.

C. Transistions: As indicated on drawings.

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 wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive carpet tile.

C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

B. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.

C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

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. Adhere carpet tile as base finish up vertical surfaces to form base. Terminate top of base with hemmed edge.

I. Trim carpet tile neatly at walls and around interruptions.

J. 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 09 6813

SECTION 09 6816
SHEET CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet, stretched-in with cushion underlay and direct-glued.

B. Matching roll carpet for direct glue installation on base.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 REFERENCE STANDARDS

A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016 (Reapproved 2021).

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2025a.

C. CRI 104 - Standard for Installation of Commercial Carpet; 2015.

D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

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. Samples: Submit two samples illustrating backing, color, and pattern for each carpet specified.

D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional requirements.
   2. Extra Carpet: Quantity equal to {15} percent of each type, color, and pattern installed.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in installing carpet with minimum three years documented experience and approved by carpet 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 MANUFACTURERS

A. Carpet:
   1. Tarkett; www.tarkett.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 CARPET

A. Roll Carpet: Same manufacturer, type, color and pattern, and face fiber characteristics as carpet tile, 6 feet wide, manufactured in same color dye lot as tile. Roll carpet to be used as carpet base as required.

B. Backing: Powerbond manufactured by Tarkett

C. Location: As indicated on drawings

D. Color: As indicated on drawings

E. Pattern: As indicated on drawings

2.03 ACCESSORIES

A. Carpet Adhesive: Recommended by carpet manufacturer.

B. Transistions: As indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive carpet.

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 carpet.

C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and alkalinity (pH).

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

3.03 INSTALLATION - GENERAL

A. Install carpet and cushion in accordance with manufacturer's instructions and CRI 104 (Commercial).

B. Verify carpet match before cutting to ensure minimal variation between dye lots.

C. Lay out carpet and locate seams in accordance with shop drawings.
   1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
   2. Do not locate seams perpendicular through door openings.
   3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
   4. Locate change of color or pattern between rooms under door centerline.
   5. Provide monolithic color, pattern, and texture match within any one area.

D. Install carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance.

3.04 DIRECT-GLUED CARPET

A. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.

B. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.

C. Apply seam adhesive to the base of the edge glued down. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.

D. Roll with appropriate roller for complete contact of adhesive to carpet backing.

E. Trim carpet neatly at walls and around interruptions.

3.05 CLEANING

A. Remove excess adhesive from floor and wall surfaces without damage.

B. Clean and vacuum carpet surfaces.

END OF SECTION 09 6816

SECTION 09 9113
EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, zinc, and lead.
   6. Floors, unless specifically indicated.
   7. Ceramic and other types of tiles.
   8. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco.
   9. Exterior insulation and finish system (EIFS).
   10. Glass.
   11. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 05 5000 - Metal Fabrications: Shop-primed items.

C. Section 05 5100 - Metal Stairs: Shop-primed items.

D. Section 09 9123 - Interior Painting.

1.03 REFERENCE STANDARDS

A. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

B. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

C. SSPC-SP 2 - Hand Tool Cleaning; 2018.

D. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

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. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

C. Samples: Submit two paper chip samples, ____by____ inch in size illustrating range of colors available for each surface finishing product scheduled.

D. 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; from the same product run, store where directed.
   3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience and approved by manufacturer.

1.06 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, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
   1. If a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.

B. Paints:
   1. Pittsburgh Paints; _____: www.ppgpaints.com/#sle.
   2. Sherwin-Williams Company; _____: www.sherwin-williams.com/#sle.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each paint material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: As indicated in Color Schedule.
   1. Selection to be made by Architect after award of contract.

2.03 PAINT SYSTEMS - EXTERIOR

A. Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including primed metal.
   1. Two top coats and one coat primer.
   2. Top Coat(s): Exterior Light Industrial Coating, DTM Acrylic, Water Based; MPI #163.
      a. Products:
         1) Behr Premium Interior/Exterior Direct-To-Metal Paint Semi-Gloss [No.3200]. (MPI #163)
         2) Pittsburgh Paints Pitt-Tech Plus EP DTM Industrial Enamel, 90-1610 Series, Semi-Gloss. (MPI #163)
         3) Valspar Professional DTM Acrylic Topcoat, No. 81120 Series, Semi-Gloss.
   3. Top Coat Sheen:
      a. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
   4. Primer: As recommended by top coat manufacturer for specific substrate.

2.04 PRIMERS

A. Primers: Provide primers as required or recommended by manufacturer of top coats.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes 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 affect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

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 or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. 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.
   3.
   4. Rinse the metal and let it dry completely for several hours.
   5. Rinse the metal with a weak solution of water and ammonia and allow it to dry.
   6. Remove any handles or other attachments from the metal.
   7. Sand the entire metal surface thoroughly, including crevices and dents.
   8. Wipe the entire surface with the tack cloths.

G. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.

2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 Commercial Blast Cleaning. Protect from corrosion until coated.

H. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance.

D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

END OF SECTION 09 9113

SECTION 09 9123
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains and varnishes.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   1. Prime surfaces to receive wall coverings.
   2. Mechanical and Electrical:
      a. In finished areas, paint insulated and exposed pipes, conduit, and boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment and electrical equipment, unless otherwise indicated.
      b. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Floors, unless specifically indicated.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 055000 - Metal Fabrications: Shop-primed items.

C. Section 099600 - High-Performance Coatings.

1.03 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.

B. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2023.

C. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

D. SSPC-SP 2 - Hand Tool Cleaning; 2018.

E. SSPC-SP 3 - Power Tool Cleaning; 2018.

F. SSPC-SP 6 - Commercial Blast Cleaning 2007.

G. SSPC-SP 13 - Surface Preparation of Concrete 1997 (Reaffirmed 2003).

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

3. Manufacturer's installation instructions.

C. Samples: Submit TWO paper "draw down" samples, 8" X 11" in size, and illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
   3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years' experience and approved by manufacturer.

1.06 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, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees Fahrenheit and a maximum of 90 degrees Fahrenheit, in ventilated area, and as required by manufacturer's instructions.

D. FIELD CONDITIONS
   1. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
   2. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
   3. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
   1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
      a. Basis-of-Design Product: Painting and coating products manufactured by
         1) Sherwin-Williams Company: www.protective.sherwin-williams.com/industries/#sle.
      b. Paints:
         1) Benjamin Moore Paints; benjaminmoore.com.
         2) PPG Paints: www.ppgpaints.com

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. 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.

3. Supply each paint material in quantity required to complete entire project's work from a single production run.
4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 016116.

C. Flammability: Comply with applicable code for surface burning characteristics.

D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

E. Colors: To be selected from manufacturer's full range of available colors.
1. Selection to be made by Architect after award of contract.
2. Extend colors to surface edges; colors may change at any edge as directed by Architect.
3. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.
4. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color coding scheme indicated.

2.03 PAINT SYSTEMS - INTERIOR

A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry units, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel and aluminum.
1. Two top coats and one coat primer.
2. Top Coat(s): High Performance Architectural Interior Latex.
   a. Products:
      1) Sherwin Williams - Pro Industrial DTM B66 Series or Scuff Tuff S24 Series (drywall high traffic)
      2) PPG Paints Pitt-Tech Plus WB DTM Industrial Enamel, 90-1110 Series, Satin.
3. Top Coat(s): Institutional Low Odor/VOC Interior Latex.
   a. Products:
      1) Sherwin Williams – ProMar 200 Zero B20 Series
      2) PPG Paints Speed-hide zero Latex, 6-4410XI Series, Satin.
4. Top Coat Sheen:
   a. Satin: MPI gloss level 4; use this sheen for items subject to frequent touching by occupants, including door frames and railings.
   b. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
5. Primer: As recommended by top coat manufacturer for specific substrate.

B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals and wood:
1. Two top coats and one coat primer.
2. Top Coat(s): High Performance Architectural Interior Latex.
   a. Products:
      1) Sherwin Williams - Pro Industrial DTM B66 Series Satin
      2) Sherwin Williams - Pro Industrial DTM B66 Series Semi-Gloss
      3) PPG Paints Pitt-Tech Plus WB DTM Industrial Enamel, 90-1110 Series, Satin.
      4) PPG Paints Pitt-Tech Plus WB DTM Industrial Enamel, 90-1210 Series, Semi-Gloss.
3. Top Coat Sheen:
   a. Satin: MPI gloss level 4; use this sheen at all locations.
   b. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
4. Primer: As recommended by top coat manufacturer for specific substrate.

C. Paint I-OP-MD-WC - Medium Duty Vertical and Overhead: Including gypsum board, plaster, concrete, concrete masonry units, uncoated steel, shop primed steel, galvanized steel and aluminum.

1. Two top coats and one coat primer.
2. Top Coat(s): Interior Light Industrial Coating, Water Based.
   a. Products:
      1) Sherwin Williams - Pro Industrial DTM B66 Series Satin
      2) Sherwin Williams - Pro Industrial DTM B66 Series Semi-Gloss
      3) PPG Paints Pitt-Tech Plus WB DTM Industrial Enamel, 90-1110 Series, Satin.
      4) PPG Paints Pitt-Tech Plus WB DTM Industrial Enamel, 90-1210 Series, Semi-Gloss.
3. Primer: As recommended by top coat manufacturer for specific substrate.

D. Paint I-OP-DF - Dry Fall: Metals; exposed structure and overhead-mounted services in utilitarian spaces, including shop primed steel deck, structural steel, metal fabrications, galvanized ducts, galvanized conduit, galvanized piping.
1. Shop primer by others.
2. Top Coat: Water Based Dry Fall for Galvanized Steel.
   a. Products:
      1) Sherwin Williams - Pro Industrial Waterborne Dryfall B42 Flat
      2) Sherwin Williams - Pro Industrial Waterborne Dryfall B42 SG
      3) PPG Paints Speed hide Super Tech Water Based Interior Dry-Fog, 6-735XI, Flat.
      4) PPG Paints Speed hide Super Tech Water Based Interior Dry-Fog, 6-727XI, Semi-Gloss.
3. Primer: As recommended by top coat manufacturer for specific substrate.

E. Paint I-TR-C - Transparent Finish on Concrete Floors.
1. 2 coats sealer.
2. Sealer: Water Based for Concrete Floors; MPI #99.
   a. Products:
      1) Sherwin Williams – H&C Clarishield Sealer
      2) PPG Paints Perma-Crete Plex-Seal WB Interior/Exterior Clear Sealer Stain, 4-6200. (MPI #99)

2.04 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
1. Alkali Resistant Water Based Primer.
   a. Products:
      1) Sherwin Williams – Loxon & Masonry Primer LX02
      2) PPG Paints Perma-Crete Interior/Exterior Alkali Resistant Primer, 4-603 Series.
2. Interior Institutional Low Odor/VOC Primer Sealer.
   a. Products:
      1) Sherwin Williams – ProMar 200 Zero Primer B28
      2) PPG Paints Speed hide zero Interior Latex Sealer, 6-4900XI.
3. Interior/Exterior Latex Block Filler.
   a. Products:
      1) Sherwin Williams – PrepRite Block Filler B25 Series
      2) PPG Paints Speed hide Masonry Hi Fill Latex Block Filler, 6-15.
4. Interior Latex Primer Sealer.
   a. Products:
      1) Sherwin Williams – ProMar 200 Zero Primer B28
      2) PPG Paints Speed hide Interior Latex Sealer, 6-2.
5. Interior Drywall Primer Sealer.
   a. Products:
      1) Sherwin Williams - ProMar 200 Zero Primer B28
      2) PPG Paints Speed hide Interior Latex Sealer, 6-2.

6. Anti-Corrosive Alkyd Primer for Metal.
   a. Products:
      1) Sherwin Williams – ProCryl Universal Metal Primer B66-310
      2) PPG Devguard Multi-Purpose Primer, 4160 Series.
7. Interior/Exterior Quick Dry Alkyd Primer for Metal.
   a. Products:
      1) Sherwin Williams – ProCryl Universal Metal Primer B66-310
      2) PPG Devguard Multi-Purpose Primer, 4160 Series.
8. Interior Water Based Primer for Galvanized Metal.
   a. Products:
   b. Sherwin Williams – Pro Industrial DTM Primer Finish B66 Series
   c. PPG Paints Pitt-Tech plus DTM Industrial Primer, 90-912 Series.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes 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. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

E. Test shop-applied primer for compatibility with subsequent cover materials.

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. Plaster and Stucco: 12 percent.
   3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
   4. Concrete Floors and Traffic Surfaces: 8 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 or repair existing paints or finishes that exhibit surface defects.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Clean concrete according to ASTM D4258. Allow to dry.
   3. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

G. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.

H. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

I. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

J. 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.

K. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
   3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

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 and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION 09 9123

SECTION 09 9600
HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. High performance coatings.

B. Surface preparation.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 099113 - Exterior Painting.

C. Section 099123 - Interior Painting: Requirements for mechanical and electrical equipment surfaces.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2018b.

C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating 2005 (Reapproved 2017).

D. SSPC V1 (PM1) - Good Painting Practice: Painting Manual, Volume 1 2016.

E. SSPC-PA 1 - Shop, Field, and Maintenance Painting of Steel 2016.

F. SSPC-PA 2 - Procedure for Determining Conformance to Dry Coating Thickness Requirements 2015.

G. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).

H. SSPC-SP 2 - Hand Tool Cleaning 1982, with Editorial Revision (2004).

I. SSPC-SP 3 - Power Tool Cleaning 1982, with Editorial Revision (2004).

J. SSPC-SP 5 - White Metal Blast Cleaning 2007.

K. SSPC-SP 6 - Commercial Blast Cleaning 2007.

L. SSPC-SP 10 - Near-White Blast Cleaning 2007.

M. SSPC-SP 13 - Surface Preparation of Concrete 1997 (Reaffirmed 2003).

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide complete list of all products to be used, with the following information for each:

1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
2. Cross-reference to specified coating system(s) product is to be used in; include description of each system.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.06 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 coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Coating Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F(32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not install materials when temperature is below 55 degrees F (13 degrees C) or above 90 degrees F (32 degrees C).

B. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.

C. Restrict traffic from area where coating is being applied or is curing.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide high performance coating products from the same manufacturer to the greatest extent possible.
   1. Basis-of-Design Product: Painting and coating products manufactured by
      a. PPG Paints: www.ppgpaints.com
   2. High-Performance Coatings:
      a. PPG Paints: www.ppgpaints.com/#sle.
      b. Sherwin-Williams Company: www.protective.sherwin-williams.com/industries/#sle.
      c. Benjamin Moore Paints; benjaminmoore.com.
   3. Substitutions: See 01 6000 - Product Requirements.

2.02 HIGH-PERFORMANCE COATINGS

A. Provide coating systems that meet the following minimum performance criteria, unless more stringent criteria are specified:

2.03 TOP COAT MATERIALS

A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.
   1. Volatile Organic Compound (VOC) Content:
      a. Provide coatings that comply with the most stringent requirements specified in the following:
         1) 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
         2) Utah Rule R307-361 Architectural Coatings Rule.
         3) 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.

B. Latex Coating Type High Performance Direct to Metal Acrylic for Hollow Metal Core Door and Window Frames and for Ferrous Metal Beams and Guardrails and Ductwork:
   1. Top Coat(s): Latex, Interior, High Performance Architectural.
      a. Sheen: Satin.
      b. Products:
         1) PPG Paints; Pitt-Tech HP Satin Enamel, 90-1110 Series: www.ppgpaints.com/#sle.

C. Epoxy Coating for Concrete:
   1. Number of coats: Two.

2. Product Characteristics:
   a. Comply with the performance requirements specified above for moderate exposure.
3. Top Coat(s): Polyamide Epoxy.
   a. Sheen: Gloss.
   b. Products:
      1) PPG Paints; Amerlock 2VOC: www.ppgpaints.com/#sle
      2) Location: As indicated on the drawings.
      3) PPG Paints, Perma-Crete Plex-Seal WB Clear Sealer, 4-6200 for Janitor Room Floor, Storage Closets and Woodshop.
   c. Color: As selected by architect from manufacturer's full line.

D. Top Coat(s): High Performance Institutional, Two-Component, Water Based Coating.
1. Sheen: Semi-Gloss for Restrooms and Shower Areas, Gypsum Board Walls & Ceilings.
2. Products:
   a. PPG Paints; Pitt-Glaze WB Water-Borne Acrylic Epoxy 16-598 Series, Gloss/16-599 Series, Semi-Gloss: www.ppgpaints.com/#sle.

E. High-Build Epoxy Coating for Exterior Exposed Steel Columns, Steel Angle Lintels, and Bollards:
1. Number of Coats: Two.
2. Product Characteristics:
3. Top Coat(s): Epoxy, High-Build.
   a. Sheen: Gloss.
   b. Products:
      1) PPG Paints; Amerlock 400 Epoxy, Semi-Gloss, AK-400 Series; www.ppgpaints.com/#sle.

F. Urethane Coating for Exterior Exposed Steel Columns, Steel Angle Lintels, and Bollards, Topcoat:
1. Number of Coats: Two.
2. Top Coat(s): Polyurethane, Two-Component.
   a. Sheen: Semi-Gloss.
   b. Products:
      1) PPG Paints; Pitthane High Build Semi-Gloss Urethane Enamel, 95-8800 Series: www.ppgpaints.com/#sle.

2.04 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by coating manufacturer.
1. Primer Sealer, Latex, Interior.
   a. Products:
      1) PPG Paints; Speed hide Latex Quick Dry Sealer, 6-2;
      2) www.ppgpaints.com/#sle.
2. Rust-Inhibitive, Water Based.
   a. Products:
      1) PPG Paints; Pitt-Tech plus DTM Industrial Primer, 4020 PF Series; www.ppgpaints.com/#sle.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Do not begin application of coatings until substrates have been properly prepared.

C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

E. Test shop-applied primer for compatibility with subsequent cover materials.

3.02 PREPARATION

A. Clean surfaces of loose foreign matter.

B. Remove substances that would bleed through finished coatings. If un-removable, seal surface with shellac.

C. Remove finish hardware, fixture covers, and accessories and store.

D. Existing Painted and Sealed Surfaces:
   1. Remove loose, flaking, and peeling paint. Feather edge and sand smooth edges of chipped paint.
   2. Clean with mixture of trisodium phosphate and water to remove surface grease and foreign matter.

E. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Prepare surface as recommended by coating manufacturer and according to SSPC-SP 13.

F. 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.

G. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning", and protect from corrosion until coated.

H. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.03 PRIMING

A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

3.04 COATING APPLICATION

A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified.

B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

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 work from damage.

END OF SECTION 09 9600

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SECTION 09 9723
CONCRETE AND MASONRY COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Moisture resistant textured concrete and masonry coatings.

B. Moisture resistant smooth concrete and masonry coatings.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 REFERENCE STANDARDS

A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2019.

B. ASTM D2369 - Standard Test Method for Volatile Content of Coatings; 2020.

C. ASTM D2370 - Standard Test Method for Tensile Properties of Organic Coatings; 2016 (Reapproved 2021).

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

E. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013 (Reapproved 2021).

1.04 SUBMITTALS

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

B. Product Data: Provide data indicating coating materials.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 MOCK-UP

A. Provide mock-up of 1, 4 feet long by 4 feet wide, illustrating coating, color, and surface sheen, for each specified coating.

B. Mock-up may remain as part of the Work.

1.06 FIELD CONDITIONS

A. Do not install materials when temperature is below 55 degrees F or above 90 degrees F.

B. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.

C. Restrict traffic from area where coating is being applied or is curing.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Concrete and Masonry Coatings:
   1. Prosoco; www.prosoco.com
   2. Substitutions: Section 01 6000 - Product Requirements.

2.02 CONCRETE AND MASONRY COATINGS

A. Provide high-build, moisture and graphiti resistant coating systems that meet the following minimum performance criteria, unless more stringent criteria are specified:
   1. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0, maximum, when tested in accordance with ASTM E84.

2.03 MATERIALS

A. Coatings - General: Provide complete systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated.

B. Water Based, Acrylic Coating:

1. Dry Film Thickness: 2-4 mils, minimum.
2. Dry Film Color: Clear.
3. Sheen: Matte (preferred) or Satin (acceptable).
4. Quantity of Coats: Minimum (2) two, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.
5. VOC Content: Measured in accordance with ASTM D2369, comply with Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

C. Cementitious Substrates: Do not begin application until substrate has cured 28 days minimum and measured moisture content is not greater than 16 percent.

D. Masonry: Verify masonry joints are struck.

3.02 PREPARATION

A. Clean surfaces of loose foreign matter.

B. Remove substances that would bleed through finished coatings.

C. Remove finish hardware, fixture covers, and accessories and store.

D. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.03 COATING APPLICATION

A. Apply coatings in accordance with manufacturer's instructions, to thicknesses specified.

B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

C. Burnished Block and Architectural CMU (Field Application).
   1. Apply a thin, even coat with low-pressure sprayer, brush or roller. If an airless sprayer is used, minimize pressure to produce a spray mist. Do not over apply.
      a. Brush or Roller Application
         1) Saturate the surface. Avoid excessive overlapping. Carefully brush out runs and drips and puddles. Reapply to produce an even appearance over the entire surface. Allow 30 to 40 minutes between applications, or until the first coat is dry. Less material will be needed for the second application.
   2. Brush out or back-roll runs and drips immediately to create a uniform film thickness and to avoid an uneven appearance.
   3. Allow treated surfaces to dry completely, at least 4 hours.
   4. Repeat steps 1–3 for the second coat. Apply the second coat perpendicular to the first coat for best finish. Less material may be required for the second coat.

3.04 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.

3.05 PROTECTION

A. Protect finished work from damage.

END OF SECTION 09 9723

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SECTION 10 1100
VISUAL DISPLAY UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Porcelain enamel steel markerboards.

1.02 RELATED REQUIREMENTS

A. Section 09 2116 - Gypsum Board Assemblies: Concealed supports in metal stud walls.

1.03 REFERENCE STANDARDS

A. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).

B. ANSI A208.1 - American National Standard for Particleboard; 2022.

C. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.

D. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2022.

E. PS 1 - Structural Plywood; 2023.

1.04 SUBMITTALS

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

B. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, and accessories.

C. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.

D. Samples: Color charts for selection of color and texture of chalkboard, porcelain enamel steel markerboard, glass markerboard, tackboard, tackboard surface covering, and trim.

E. Test Reports: Show compliance to specified surface burning characteristics requirements.

F. Manufacturer's printed installation instructions.

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide life of the building warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.01 VISUAL DISPLAY UNITS

A. Porcelain Enamel Steel Markerboards:
   1. Manufacturers:
      a. ADP LEMCO, https://www.adplemco.com/
      b. Substitutions: See Section 01 6000 - Product Requirements.
   2. Color: As selected from manufacturer's full range.
   3. Core: Particleboard, manufacturer's standard thickness, laminated to face sheet.
   4. Backing: Aluminum foil, laminated to core.
   5. Size: As indicated on drawings.
   6. Frame: Extruded aluminum , with concealed fasteners.
   7. Frame Finish: Anodized, natural.
   8. Accessories: Provide chalk tray, map rail, flag holder, and map hooks.

2.02 MATERIALS

A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.

B. Vinyl Coated Fabric: ASTM F793/F793M Category IV.

C. Plywood: PS 1 Grade C-D, softwood.

D. Hardboard for Cores: ANSI A135.4, Class 1 - Tempered, S2S (smooth two sides).

E. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.

F. Fiber Board: ASTM C208, cellulosic fiber board.

G. Foil Backing: Aluminum foil sheet, 0.005 inch thick.

H. Steel Sheet Backing: 28 gauge, 0.0149 inch, galvanized.

I. Adhesives: Type used by manufacturer.

2.03 ACCESSORIES

A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall , full width of frame.

B. Map Supports: Formed aluminum sliding hooks, roller brackets, and provide 1 for each 2' of rail to fit map rail.

C. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.

D. Flag Holders: Cast aluminum bored to receive 1 inch diameter flag staff, bracketed to fit top rail of board.

E. Marker Tray: Aluminum, manufacturer's standard profile, one piece full length of markerboard, molded ends, concealed fasteners, same finish as frame.

F. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.02 INSTALLATION

A. Install boards in accordance with manufacturer's instructions.

B. Secure units level and plumb.

C. Butt Joints: Install with tight hairline joints.

3.03 CLEANING

A. Clean board surfaces in accordance with manufacturer's instructions.

B. Cover with protective cover, taped to frame.

C. Remove temporary protective cover at Date of Substantial Completion.

END OF SECTION 10 1100

SECTION 10 1400
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Room and door signs.

B. Interior directional and informational signs.

C. Building identification signs.

D. Plaque.

1.02 RELATED REQUIREMENTS

A. Section 26 5100 - Interior Lighting: Exit signs required by code.

1.03 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.04 SUBMITTALS

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

B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.

1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
3. Submit for approval by Owner through Architect prior to fabrication.

D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.

E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.

F. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.

1.05 QUALITY ASSURANCE

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor or building.

C. Store tape adhesive at normal room temperature.

1.07 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Flat Signs:
   1. Best Sign Systems, Inc; None - N/A: www.bestsigns.com/#sle.
   2. Mohawk Sign Systems, Inc; None - N/A: www.mohawksign.com/#sle.
   3. ASI Sign Systems; www.asisignage.com.
   4. Innerface Sign Systems; www.innerface-signage.com
   5. Mohawk Sign Systems; www.mohawksign.com
   6. Vomar Products; www.vomarproducts.com
   7. Substitutions: See Section 01 6000 - Product Requirements.

B. Dimensional Letter Signs:
   1. ASI Signage Innovations; www.asisignage.com.
   2. APCO Graphics, Inc; www.apcosigns.com.
   3. Interface Sign Systems, Inc.; www.innerface-signage.com.
   4. Mohawk Sign Systems; www.mohawksign.com
   5. Substitutions: See Section 01 6000 - Product Requirements.

C. Plaques:
   1. APCO Graphics, Inc; www.apcosigns.com.
   2. ASI Signage Innovations; www.asisignage.com.
   3. Gemini, Inc.; www.signletters.com
   4. Interface Sign Systems, Inc.; www.innerface-signage.com.
   5. Mohawk Sign Systems; www.mohawksign.com
   6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 2017, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
   1. Sign Type: Flat signs with engraved panel media as specified.
   2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
   3. Office and Classroom: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section for replaceable occupant name.
   4. Conference and Meeting Rooms: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section with sliding "In Use/Vacant" indicator.
   5. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
   6. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", and braille.

C. Interior Directional and Informational Signs:
   1. Sign Type: Same as room and door signs.
   2. Sizes: As indicated on drawings.
   3. Wording of signs is scheduled below and locations on the drawings.

D. Building Identification Signs:
   1. Use individual metal letters.
   2. Mount on outside wall in location indicated on drawings.

E. Vinyl Signs:
   1. Fabricate letters and numbers to required sizes and styles.

F. Plaque: See Allowance for details.

2.03 SIGN TYPES

A. Flat Signs: Signage media without frame.
   1. Edges: Square.
   2. Corners: Radiused.
   3. Clear Cover: For customer produced sign media, provide clear cover of polycarbonate plastic, glossy on back, non-glare on front.
   4. Wall Mounting of One-Sided Signs: Tape adhesive.

B. Color and Font: Unless otherwise indicated:
   1. Character Font: Font to be selected and provided by architect.
   2. Character Case: Upper case only.
   3. Background Color: manufactures full range of colors.
   4. Character Color: Contrasting color.

2.04 TACTILE SIGNAGE MEDIA

A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
   1. Total Thickness: 1/16 inch.

2.05 PLAQUES

A. Metal Plaques:
   1. Metal: Aluminum casting.
   2. Metal Thickness: 1/8 inch, minimum.

2.06 DIMENSIONAL LETTERS

A. Metal Letters:
   1. Metal: Aluminum casting.
   2. Finish: Brushed, satin.
   3. Mounting: Concealed screws.

2.07 ACCESSORIES

A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

B. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

E. Where signs are installed on glass provide a blank plate of equal size on opposite side of glass to conceal adheisive.

3.03 SIGNAGE SCHEDULE

A. See site drawings for site sign locations and sign types.

B. See interior finish drawing sheets for building sign locations.

C. Verify final room numbers with owner.

3.04 SIGNAGE GRAPHICS

A. See site drawings for site sign types.

B. See building signage graphics in drawings A-681.

END OF SECTION 10 1400

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. Electric hand/hair dryers.

D. Diaper changing stations.

E. Utility room accessories.

1.02 RELATED REQUIREMENTS

A. Section 09 2216: Concealed supports for accessories, including in wall framing and plates.

B. Section 10 2113.16 - Plastic-Laminate-Clad Toilet Compartments.

C. Section 22 4000 - Plumbing Fixtures: Under-lavatory pipe and supply covers.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

C. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2022.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

E. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

F. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2023.

G. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017 (Reapproved 2022).

H. ASTM C1036 - Standard Specification for Flat Glass; 2021.

I. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2024.

J. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2022.

1.04 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.

1.05 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.

C. Samples: Submit two samples of each accessory, illustrating color and finish.

D. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:
   1. American Specialties, Inc: www.americanspecialties.com/#sle.
   2. Bradley Corporation: www.bradleycorp.com/#sle.
   3. Bobrick: www.bobrick.
   4. Substitutions: Section 01 6000 - Product Requirements.

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 2 keys for each accessory to Owner; master key lockable accessories.

C. Stainless Steel Sheet: ASTM A666/A666M, Type 304.

D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.

E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

F. Zinc Alloy: Die cast, ASTM B86.

G. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

H. Adhesive: Two component epoxy type, waterproof.

I. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

J. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

B. Chrome/Nickel Plating: ASTM B456, SC 2, polished finish, unless otherwise noted.

C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.

D. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

E. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

F. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 COMMERCIAL TOILET ACCESSORIES

A. Toilet Paper Dispenser: Owner furnished, Contractor installed.

B. Paper Towel Dispenser: Owner furnished, Contractor installed.

C. Soap Dispenser: Owner furnished, Contractor installed.

D. Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.
   1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
   2. Size: as shown on the drawings.
   3. Frame: 0.05 inchangle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
   4. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.

E. Grab Bars: Stainless steel, smooth surface.
   1. Heavy Duty Grab Bars: Floor supports are acceptable if necessary to achieve load rating.
      a. Push/Pull Point Load: Minimum 1000 pound-force, minimum.
      b. Dimensions: 1-1/2 inch outside diameter, minimum 0.125 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
      c. Length and Configuration: As indicated on drawings.

F. Combination Sanitary Napkin/Tampon Dispenser with Disposal: Stainless steel, surface-mounted.
   1. Door: Seamless 0.05 inch door with returned edges and tumbler lock.
   2. Cabinet: Fully welded, 0.03 inch thick sheet.
   3. Operation: No charge; no coin slots.
   4. Identify dispensers slots without using brand names.
   5. Minimum capacity: 15 napkins and 20 tampons.

G. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.

2.05 COMMERCIAL SHOWER AND BATH ACCESSORIES

A. Folding Shower Seat: Wall-mounted surface; welded tubular seat frame, structural support members, hinges, and mechanical fasteners of Type 304 stainless steel, L-shaped, right hand and L-shaped, left hand seat.
   1. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of Ivory color.
   2. Size: ADA Standards compliant.

B. Wall-Mounted Soap Dish: Heavy duty, seamless stainless steel, surface-mounted with drain holes, without grab bar, satin finish; with concealed mechanical fastening suitable for substrate and backplate.

C. Robe Hook: Heavy-duty stainless steel, double-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.

2.06 UNDER-LAVATORY PIPE AND SUPPLY COVERS

A. Specified in 22 4000 - Plumbing Fixtures.

2.07 ELECTRIC HAND/HAIR DRYERS

A. Electric Hand Dryers: Traditional fan-in-case type, with downward fixed nozzle.
   1. Operation: Automatic, sensor-operated on and off.
   2. Mounting: Wall-mounted - surface.
   3. Cover: Nickel.
      a. Tamper-resistant screw attachment of cover to mounting plate.
   4. Electric Hand Dryer Products:
      a. Dyson; Dyson Air blade V (Nickel): www.dyson.com.
      b. Substitutions: Section 01 6000 - Product Requirements.

2.08 DIAPER CHANGING STATIONS

A. Diaper Changing Station: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.
   1. Material: Polyethylene.
   2. Mounting: Surface.
   3. Color: Gray.
   4. Minimum Rated Load: 250 pounds.

2.09 UTILITY ROOM ACCESSORIES

A. Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.

D. Verify that field measurements are as indicated on drawings.

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 10 2800

SECTION 10 2601
WALL AND CORNER GUARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Corner guards.

1.02 SUBMITTALS

A. See Section , for submittal procedures.

B. Product Data: Indicate .

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wall and Corner Guards:
   1. Babcock-Davis; None - N/A: www.babcockdavis.com/#sle.
   2. Construction Specialties, Inc; None - N/A: www.c-sgroup.com/#sle.
   3. Inpro; None - N/A: www.inprocorp.com/#sle.
   4. Substitutions:

2.02 COMPONENTS

A. Corner Guards - Surface Mounted:
   1. Material: Type 304 stainless steel, No. 4 finish, None - N/A gage, .0625 inch thick.
   2. Performance: Resist lateral impact force of at any point without damage or permanent set.
   3. Width of Wings:
   4. Corner: 1/8" radius.
   5. Length: One piece 48 inches high.

2.03 FABRICATION

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.

B. Verify that field measurements are as .

3.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.

B. Position corner guard 4 inches above finished floor to 52 inches high.

C. Install at all corridor locations that do not have a wainscot, or CMU.

3.03 TOLERANCES

A. Maximum Variation From Required Height:

END OF SECTION 10 2601

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SECTION 10 5100
LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal lockers.

B. Locker benches.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete base construction.

B. Section 06 1000 - Rough Carpentry: Wood base construction.

C. Section 06 1000 - Rough Carpentry: Wood blocking and nailers.

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

1.04 SUBMITTALS

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

B. Product Data: Manufacturer's published data on locker construction, sizes and accessories.

C. Shop Drawings: Indicate locker plan layout, numbering plan.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Lockers:
   1. Art Metal Products; None - N/A: www.artmetalproducts.com/#sle.
   2. Lyon Workspace Products; None - N/A: www.lyonworkspace.com/#sle.
   3. Penco Products, Inc; None - N/A: www.pencoproducts.com/#sle.
   4. Republic Storage Systems Co; None - N/A: www.republicstorage.com/#sle.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOCKER APPLICATIONS

A. Student Lockers: Two tier metal lockers, recessed mounted.
   1. Width: 12 inches.
   2. Depth: 12 inches.
   3. Height: 72 inches.
   4. Fittings: Hat shelf at ADA lockers, 2 coat hooks.
   5. Locking: Built-in combination locks.
   6. Provide sloped top.

B. PE Lockers: Five tier metal lockers, On 4" preinstalled concrete curb - wall mounted or back to back as per plan.
   1. Width: 12 inches.
   2. Depth: 12 inches.
   3. Height: 72 inches.
   4. Locking: Padlock hasps, for padlocks provided by Owner.
   5. Provide sloped top.

C. Kitchen Lockers: Two tier metal lockers, wall mounted with matching closed base.
   1. Width: 12 inches.
   2. Depth: 12 inches.
   3. Height: 72 inches.

4. Fittings: shelf at 15" at ADA lockers, 2 side coat hooks, and one double prong ceiling hook.
5. Locking: Padlock hasps, for padlocks provided by Owner.
6. Provide sloped top.

D. Locker Room Benches: Stationary type; Honed CMU Base with precast concrete cap. See drawings for details.
1. Height: 18 inches
2. Length: Varies as indicated on drawings.

2.03 METAL LOCKERS

A. Lockers: Factory assembled, made of formed sheet steel, ASTM A653/A653M SS Grade 33/230, with G60/Z180 coating, stretcher leveled; metal edges finished smooth without burrs; baked enamel finished inside and out.
1. Where ends or sides are exposed, provide flush panel closures.
2. Provide filler strips where indicated, securely attached to lockers.
3. Color: Custom allow up to six (6) different colors.
4. Pattern: As indicated on drawings.

B. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.
1. Body and Shelves:
a. At Student Lockers: 24 gage body/shelves, 24 gage backing
b. At PE Lockers: 16 gage body/shelves, 18 gage backing
c. At Athletic Lockers: 16 gage body/shelves, 18 gage backing
d. At Coaches Lockers: 16 gage body/shelves, 18 gage backing
e. At Kitchen Lockers: 24 gage body/shelves, 24 gage backing

C. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.
1. Door Frame: 16 gage, 0.0598 inch, minimum.

D. Doors: Hollow channel edge construction, 1 inch thick minimum; welded construction, channel reinforced top and bottom with intermediate stiffener ribs, grind and finish edges smooth.
1. Door Metal thickness:
a. At Student Lockers: 16 gage doors
b. At PE Lockers: 14 gage doors
c. At Athletic Lockers: 14 gage doors
d. At Coaches Lockers: 14 gage doors
e. At Kitchen Lockers: 16 gage doors
2. Form recess for operating handle and locking device.
3. Provide ventilation louvers in top and bottom of face of door at student and kitchen lockers. Doors at PE, Athletic, and Coaches office to be diamond perforated metal.

E. Hinges: Two for doors under 42 inches high; three for doors over 42 inches high; weld securely to locker body and door.
1. Hinge Thickness: 14 gage, 0.0747 inch.

F. Sloped Top: 20 gage, 0.0359 inch, with closed ends.

G. Trim: 20 gage, 0.0359 inch.

H. Number Plates: Provide oval shaped brass plates. Form numbers 1/2 inch high of block font style with ADA designation, in contrasting color.

I. Locking device supplied by Owner at athletic, coaches, PE, and kitchen lockers.

J. Student lockers are to be supplied with a built in combination lock, five (5) combinations available, master hey controlled. Provide ADA compliant locks at ADA lockers.

K. Base:
1. Continous Z base - except at Athletic Team and P.E. lockers.

2. Pre-poured 4 inch concrete base only at Athletic Team and P.E. lockers. Concrete curb by others.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared bases are in correct position and configuration.

B. Verify bases and embedded anchors are properly sized.

3.02 INSTALLATION

A. PE Lockers: Install alternating 2-tier and 6-tier in sequence.

B. Install in accordance with manufacturer's instructions.

C. Install lockers plumb and square.

D. Place and secure on prepared base.

E. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lb.

F. Bolt adjoining locker units together to provide rigid installation.

G. Install end panels.

H. Install accessories.

I. Replace components that do not operate smoothly.

3.03 CLEANING

A. Clean locker interiors and exterior surfaces.

END OF SECTION 10 5100

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SECTION 11 6823
EXTERIOR COURT ATHLETIC EQUIPMENT

PART 1 GENERAL

1.01 SECTIONS INCLUDES

A. Basketball furnishings and equipment

1.02 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product specified, including detailed installation diagrams and recommended installation methods.

B. Shop Drawings: Indicate all materials, dimensions, welds, finish, etc. for field fabricated items.

C. Maintenance Data: For site furnishings to include in O&M Manuals.

1.03 QUALITY ASSURANCE

A. Furnish paint for touch-up as required.

B. Install pre-manufactured items, poured-in-place or pre-cast items, and all related materials required to complete the work indicated on the drawings and/or specified.

C. Materials Inspection: The Contractor shall inspect all items upon delivery to ensure no damage to material or finish. Minor repairs and/or touch up shall be accepted only upon prior authorization from the landscape architect and shall conform, at minimum, to manufacturer’s standards.

1.04 WARRANTY

A. Contractor shall warrant work as provided by the General and Supplementary Conditions and Division 01 Specifications.

PART 2 PRODUCTS

2.01 MATERIALS

A. Basketball Post & Backboard: 5-9/16” diameter heavy duty gooseneck type galvanized pole with maximum 6’ extension; steel powder coated fan backboard; heavy duty single ring goal.

2.02 MANUFACTURERS

A. Douglas Sports, (800) 553.8907 or www.douglas-sports.com.

B. ADP Lemco Inc., (801) 280.4000 or www.adplemco.com

C. Component Playgrounds, (877) 985.2474 or www.componentplaygrounds.com

D. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Install furnishings and equipment level, plumb, true, securely anchored and positioned at locations indicated on Drawings.

C. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

D. Touch-up paint, as necessary, all blemishes incurred during shipping or assembly, color as designated, to manufacturer's standards.

3.03 ADJUSTING

A. Upon completion of the installation of site furnishings, check each item and verify that all equipment is properly installed; verify that all trim is in place; adjust all components as necessary to ensure proper operation; remove all labels from equipment.

B. Make necessary adjustments for safe, efficient and smooth operation.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products after Substantial Completion.

3.05 CLEANING

A. Remove all packing materials from job site.

B. Clean or restore marred surfaces.

END OF SECTION 11 6823

SECTION 12 2400
WINDOW SHADES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Window shades and accessories.

1.02 RELATED REQUIREMENTS

A. Section : Concealed wood blocking for attachment of headrail brackets.

B. Section : Substrate for window shade systems.

1.03 REFERENCE STANDARDS

A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023, with Errata.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequencing:
   1. Do not fabricate shades until field dimensions for each opening have been taken.
   2. Do not install shades until final surface finishes and painting are complete.

1.05 SUBMITTALS

A. See Section , 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. Shop Drawings: Include .

D. Selection Samples: Include .

E. Verification Samples: Minimum size square, representing actual materials, color and pattern.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than years of experience.

B. Installer Qualifications: Company specializing in performing work of this type with minimum three years of documented experience.

1.07 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.

1.08 FIELD CONDITIONS

1.09 WARRANTY

A. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
   1. Shade Hardware:
   2. Fabric:
   3. Aluminum and Steel Coatings: .

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manually Operated Roller Shades:
   1. Draper, Inc: www.draperinc.com/#sle.
   2. Lutron Electronics Co., Inc; None - N/A: www.lutron.com/#sle.
   3. Hunter Douglas Architectural: www.hunterdouglasarchitectural.com/#sle.

4. Levolor; None - N/A: www.levolor.com/commercial/#sle.
5. Mecho; Mecho/5: www.mechoshade.,com.
6. Substitutions:

2.02 WINDOW SHADE APPLICATIONS

A. Interior Roller Shades:
1. Type: Roll down, closed position is at window sill.
2. Fabric: ThermalVeil Dense Vertical Weave with 2% Open.
3. Color: As selected by Architect from manufacturer's full range of colors.
4. Mounting:
5. Operation: Manual.

2.03 ROLLER SHADES

A. Roller Shades: Fabric roller shades complete with mounting brackets, roller tubes, hembars, hardware and accessories.
1. Drop: .
2. Size:

B. Fabric: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
1. Flammability: Pass NFPA 701 large and small tests.

C. Roller Tubes: As required for type of operation.

D. Hembars: Designed for weight requirements and adaptation to uneven surfaces, to maintain bottom of shade straight and flat.

E. Manual Operation for Interior Shades: ; .

2.04 ACCESSORIES

A. Fascias: Size as required to conceal shade mounting.
1. Style: As selected by Architect from shade manufacturer's full selection.
2. Material and Color: To match shade.

B. Brackets and Mounting Hardware: As recommended by manufacturer for mounting configuration and span indicated.

C. Fasteners: Non-corrosive, and as recommended by shade manufacturer.

2.05 FABRICATION

A. Field measure finished openings prior to ordering or fabrication.

B. Fabricate shades to fit openings within specified tolerances.
1. Vertical Dimensions: Fill openings from head to sill with space between bottom bar and .
2. Horizontal Dimensions - Inside Mounting: Provide symmetrical light gaps on both sides of shade not to exceed total.

C. Dimensional Tolerances: As recommended in writing by manufacturer.

D. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

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. Installation Tolerances:
   1. Maximum Offset From Level:

C. 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.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 12 2400

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SECTION 12 3600
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Laminate Countertops

B. Solid surface countertops

1.02 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

D. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

E. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

F. SEFA 2 - Installations; 2010.

1.03 SUBMITTALS

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

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.

D. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

E. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 COUNTERTOPS

A. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
   1. Laminate Sheet, Type ___: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
      a. Manufacturers:
         1) Formica Corporation; _____: www.formica.com/#sle.
         2) Lamin-Art, Inc; _____: www.laminart.com/#sle.

3) Panolam Industries International, Inc; _____: www.panolam.com/#sle.
4) Wilsonart; _____: www.wilsonart.com/#sle.
5) Substitutions: See Section 01 6000 - Product Requirements.

b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
c. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
d. Finish: As indicated on drawings..
e. Surface Color and Pattern: As indicated on drawings.
f. Location(s): As indicated on drawings.

2. Back and End Splashes: Same material, same construction.

B. Ultracompact Surface Countertops: Sintered stone, chemically-resistant substrate.
1. Manufaturers:
a. Cosentino USA, Inc.; www.dekton.comSubstitutions: See Section 01 6000 - Product Requirements.
b. Substitutions: See Section 01 6000 - Product Requirements.
2. Composition: Selected raw materials formed into flat slabs utilizing sinterized particle technology.
3. Color: To be selected from manufacturer’s full color range.
4. Surface finish: As indicated on drawings.
5. Surface Color and Pattern: As indicated on drawings.
6. Slab Thickness: 3 cm
7. Location(s): Science Classrooms and Science Lab Prep Rooms.

C. Solid Surfacing Countertops: 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; None - N/A: www.avonitesurfaces.com/#sle.
2) Dupont; Natural Gray: www.corian.com/#sle.
3) Formica Corporation; None - N/A: www.formica.com/#sle.
4) Wilsonart; None - N/A: www.wilsonart.com/#sle.
5) Substitutions: See Section 01 6000 - Product Requirements.
b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
c. Finish on Exposed Surfaces: Semi-gloss, gloss rating of 25 to 50.
d. Color/Pattern Family: Solid color, light colors.
3. Other Components Thickness: 1/2 inch, minimum.
4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; radiused edge.
5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
6. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.
7. Location(s): As indicated on drawings.

2.02 ACCESSORIES

A. Fixed Top-Mounted Countertop Support Brackets:
1. Material: Steel.
2. Finish: Manufacturer's standard, factory-applied, textured powder coat.
3. Color: Black.
4. Products:

a. Centerline Brackets; Front Mounting Plus Countertop Support: www.countertopbracket.com/#sle.
b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.
   2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
   1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
   2. Height: 4 inches, unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install laboratory worksurface countertops in compliance with requirements of SEFA 2.

B. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

C. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.

D. Seal joint between back/end splashes and vertical surfaces.

3.04 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.

B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.

C. Field Joints: 1/8 inch wide, maximum.

3.05 CLEANING

A. Clean countertops surfaces thoroughly.

3.06 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 12 3600

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DIVISION 22
PLUMBING INDEX

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SECTION 22 0501
COMMON PLUMBING REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to work of this section.

B. Related Sections: Refer to "Electrical Requirements for Plumbing Equipment" Division 26 for basic electrical requirements, for all Mechanical equipment in Division 23. Special and specific electrical requirements are specified within each respective equipment specification section.

1.2 SCOPE OF WORK - GENERAL

A. This section specifies the basic requirements for plumbing installations and includes requirements common to Section 220000. It expands and supplements the requirements specified in sections of Division 01 General Requirements.

B. The work covered by the Plumbing Sections of the Specifications shall include the furnishing of all materials, labor, transportation, tools, permits, fees, inspections, utilities and incidentals necessary for the complete installation of all mechanical work required in the Contract Drawings.

C. It is the intent of the Contract Documents to provide an installation that is complete and operable in every respect. In the event that additional details or special construction is required for work indicated or specified under this section of work or work specified in other sections, it shall be the responsibility of the Contractor to provide all material and equipment which is usually furnished with such systems in order to complete the installation, whether mentioned or not.

D. The Contractor shall review all Contract Drawings (Plumbing and HVAC) and Specifications and include in his bid all work specifically as being performed in the Plumbing section. The Contractor shall be responsible for all work performed by his subcontractors.

1.3 DEFINITIONS

A. "Provide" shall mean "furnish and install complete and ready for intended use."

B. "Indicated" shall mean "indicated on drawings" and/or the intent for a complete and operable system.

C. "Concealed" shall mean "hidden from sight as in trenches, chases, furred spaces or hung ceilings.

D. "Exposed" shall mean "not concealed", as defined above.

E. "Noted" shall mean "noted on Plumbing and HVAC drawings or in specifications".

F. "Contractor" also referred to as "Plumbing Contractor" or "the Contractor", shall mean "the Plumbing Contractor".

1.4 CODES AND STANDARDS

A. All plumbing work shall be installed in strict accordance with the most current edition of the International Building Code (IBC) or International Plumbing Code, International Mechanical Code (IMC), Uniform Plumbing Code (UPC), National Fire Protection Association (NFPA), International Fire Code (IFC), National Electrical Code (NEC), Energy Code IECC and ASHRAE-90.1, and all applicable state and local codes, laws and ordinances that relate to the work to be accomplished.

1.5 PERMITS AND FEES

A. The Contractor shall obtain and pay for all required permits and fees necessary to fully complete all work included in the Contract Drawings and Specifications.

1.6 CONSTRUCTION OBSERVATIONS

A. During the course of construction of this project, the engineer shall visit the project site periodically on an as-needed basis. The construction observation intervals may vary depending on the progress and/or stage of construction and whether sewer, vents, water, natural gas, air, Domestic cold and hot water for drains, and overflows, condensate piping, etc., is being placed below grade and/or concealed, surface mounted items, setting of equipment, equipment connections, etc. However, written field questions are encouraged and welcomed throughout the course of construction and shall be answered promptly in writing, to keep the project construction on schedule. The project foreman should have the building plans, construction schedules, etc., affixed in mind, so the plumbing systems defined in the construction documents are to be assembled, along with the setting of equipment, of parts and pieces, related to the project are anticipated, to prevent delays or emergencies.

B. The engineer shall make one (1) final inspection. The contractor shall notify the engineer that the installation is complete, i.e., the systems are operating and have been tested and balanced, and everything is complete and operational, all equipment connections have been made and the owner's representatives have been trained. At this time the engineer, the contractor, and the owner's representative shall schedule a time to walk the project for evaluation, and record in writing the items found to be incomplete. The contractor shall make the corrections within one week after this inspection. If at the conclusion of the observation tour the owner and engineer determine that additional visits are required to complete this project.

C. On extra visits, the contractor shall report to the engineer that all systems are complete, and the project is ready for the owner's acceptance.

1.7 INTENT AND INTERPRETATION

A. The Drawings and Specifications are intended to supplement each other, and any details contained in one and not the other shall be included as if contained in both. Items not specifically mentioned in the specifications or noted on the drawings, but which are obviously necessary to make a complete working installation shall be included.

B. The drawings are partly diagrammatic and do not necessarily show the exact location of all new piping and existing utilities, unless specifically dimensioned.

C. Riser and other diagrams are schematic only and do not necessarily show the physical arrangement of the equipment. They shall not be used for obtaining quantities or lineal runs of piping.

D. The location of all piping shall be checked to determine that it clears all openings and structural members; that it may be properly concealed; and that it clears cabinets, lights and equipment having fixed locations.

E. Plumbing drawings shall serve as the working drawings for this portion of the work, but the Contractor shall refer to the Architectural, Structural, HVAC, and Electrical drawings for additional detail affecting the installation of his work. Architectural drawings shall take precedence over the Plumbing drawings if any dimensional discrepancies exist.

F. The approximate location of each item is indicated on the drawings. These drawings are not intended to give complete and exact details in regard to location. Exact locations are to be determined by actual measurements at the building and will in all cases be subject to the approval of the Architect, who reserves the right to make any reasonable changes in the locations indicated without additional cost.

G. The contractor shall not make a change in a system, system layout, and/or equipment, except he receives written approval or drawing over the signature of the engineer.

1.8 SUBMITTAL OF EQUIPMENT FOR APPROVAL

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 01 General Requirements for submittal definitions, requirements, and procedures.

B. SHOP DRAWINGS AND PRODUCT DATA OF EQUIPMENT BEING INSTALLED IN THE PROJECT: After the contract is awarded, but prior to manufacture or installation of any equipment, the contractor shall assemble and submit Shop Drawings, parts lists, Brochures, etc., for the materials and equipment requiring approval for each section of this specification. A brief description of submittal conditions is given below. Refer to identified sections for detailed submittal requirements.

C. Confirming and approving substitute equipment for the project.

1. Confirm that the substitute equipment is approved for installation before entering it into the base bid. It must be defined as to name, catalog number or both in a published addendum. **If not approved, do not enter in the base bid**.
2. Each unit shall state the name of the equipment manufacturer (name, address, phone, email, etc.) catalog number, size, physical dimensions and weight, energy characteristics (electrical and/or fuel), operating characteristics, materials from which constructed, any special conditions that may apply to the construction of the unit, etc.
3. The equipment must explain and define in detail the components that make-up the unit, so the owner and engineer can determine, define the replaceable parts during the life of the unit.

4. Complete operating instruction, normal maintenance recommendations, start-up procedures, etc.
5. In general, the contractor shall acquaint himself with the equipment to confirm that it can be installed as shown on the plans and from his experience perform the indicated function in the system where installed.

6. In the course of reviewing the shop drawings, **the Contractor shall confirm the energy usage** (gas, power, air, water, drains, physical size, weight etc.) and determine if these services are available at the equipment characteristics. Namely: confirm voltage, phase, etc., with the project's electrical characteristics. Availability of fuels with the serving utility, also drains, water (hot and cold) pipe sizes, etc., or if there are discrepancies in the services. If the indicated equipment services are not available, inform the engineer by phone and in writing, also note on the shop drawing. This cooperative effort will correct a problem before the equipment arrives at the job site.
   a. The shop drawings shall also indicate the scheduled delivery dates the equipment will be at the site.
   b. If the contractor foresees any problems with equipment size, weight, delivery, etc., it shall be noted in writing, attached to the shop drawings.

1.9 RECORD DOCUMENTS

A. Contractor shall record differences between plumbing systems as installed and those indicated in Contract Documents on a set of prints of plumbing drawings to be furnished by Architect. Return these prints to Architect at completion of project. Notations made on drawings shall be neat and legible. Comply with Division 01 General Requirements.

1.10 OPERATION AND MAINTENANCE MANUALS

A. Contractor shall prepare and submit Operation and Maintenance Manuals for mechanical systems provided under this Contract. Comply with Division 01 requirements for procedures and requirements for preparation and submittal of manuals.

B. Manual binder shall have permanent lettering of a contrasting color. Information to be included on the binder is as follows:

Enter binder information below

C. The front cover shall be lettered as follows:

PLUMBING
OPERATION AND MAINTENANCE
MANUAL
(PROJECT NAME)
(CITY AND STATE)
(YEAR)

OWNER:	(*NAME)*
ARCHITECT:	*(NAME)*
PLUMBING ENGINEER:	Nielson Engineering Inc.
GENERAL CONTRACTOR:	*(NAME)*
PLUMBING CONTRACTOR:	*(NAME)*

The spine shall be lettered as follows:

PLUMBING O & M MANUAL (*Year)*
(Project Name)

D. Provide a master index at beginning of Manual showing items included. Use plastic tab indexes for sections of Manual.

E. Cover section shall consist of name, address, and phone number of Project Architect, General Contractor, Mechanical Engineer, Mechanical Contractor, and all Mechanical Sub-Contractors.

F. Provide a separate section for each section of the specifications. Provide index for each section listing equipment included. Include all items specified in Sections 220529 through 226313. Provide a list of each type of equipment supplied with the local supplier's name, address, and phone number.

G. Include descriptive literature (manufacturer's catalog data) of each manufactured item. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined. Data sheets shall be original. Copies are not acceptable.

H. One (1) copy of the manual shall be submitted for review and approval by the Engineer. After approval, submit three (3) copies of manual to the Owner for approval unless otherwise directed by Division 1 requirements. Information to be included in manual:
   1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
   2. Manufacturer's printed operating procedures to include start-up, break-in, routine, and normal operating instructions; regulation, control, stopping shutdown, and emergency instructions; and summer and winter operating instructions.
   3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
   4. Servicing instructions and lubrication charts and schedules.
   5. Schematic control diagrams (as built status) for each automatic control system. Mark correct operating setting for each control instrument on these diagrams. A second complete set of control diagrams encased in clear plastic laminate shall be furnished.
   6. Valve schedule indicating the valve symbol (tag number), valve location by room number and description, valve purpose and system served, and valve size. Provide one corresponding set of full-size plumbing prints (as-builts status) showing these valve locations for cross-reference. A second complete set of valve schedules (8½" x 11") encased in clear plastic laminate and fitted in an aluminum holding frame shall be furnished to the Owner.
   7. Testing, Adjusting and Balancing Report.
   8. Test records and certifications.
   9. Instruction period checklist.
   10. Warranty information.

1.11 OPERATION AND MAINTENANCE INSTRUCTION AND TRAINING

A. The Contractor shall instruct the Owner's Representative(s) in the Operation and Maintenance procedures described in the Operation and Maintenance Manual. Comply with Division 1 requirements.

B. Individuals present shall include Contractors, Subcontractors, and equipment factory representatives. These individuals shall assist in instruction and start-up.

C. Minimum instruction time shall be eight (8) hours unless otherwise specifically noted.

D. All Plumbing systems shall be properly functioning prior to instruction period.

E. Contractor shall prepare a checklist of all equipment and systems requiring instruction and maintenance for verification by the Owner's Representative of satisfactory start-up and instruction. A copy of this checklist shall be included in the Operation and Maintenance Manual.

1.12 GUARANTEE

A. Contractor shall guarantee the satisfactory operation of all material and equipment installed under section 220000 and shall repair or replace to the satisfaction of the Owner or Architect, any defective materials, equipment, or workmanship which may show itself within one year from the date of acceptance.

1.13 CLEANING

A. The Contractor shall, at all times, keep the premises free from accumulations of waste material or rubbish.

B. At completion of the job, the Contractor shall remove all tools, scaffolding, and surplus materials.

PART 2 PRODUCTS

2.1 GENERAL MATERIALS AND EQUIPMENT REQUIREMENTS

A. All materials, in general, shall conform to the requirements of all agencies or publications specified and described in Division 01 of the Contract Specifications.

B. Materials and equipment to be provided shall be the standard catalog products of manufacturers regularly engaged in the manufacture of products conforming to these specifications and shall essentially duplicate materials and equipment that have been in satisfactory use at least two years.

C. All plumbing fixtures, pipes, fittings, and materials specified shall comply with the certification of 'Buy America' compliance for manufactured products.

2.2 SUBSTITUTIONS AND APPROVAL OF PRODUCT OPTIONS

A. Substitute equipment is encouraged if it is truly an equal to the specified items.
   1. The items and/or equipment specified in the contract documents are standard manufacturers items found in suppliers' catalogs, except it be indicated as special. The designer has taken time and effort to analyze, evaluate and prove to himself that the specified units will perform the function needed, wherein it is placed. This means the responsibility for the function of the specified equipment rests with the designer, who knows and understands what is to be accomplished.
   2. If a **supplier** and/or the **contractor** desire to substitute equipment in place of a specified item, he may do so, but he takes upon himself or herself the **full responsibility** that the substituted equipment will equal all of the performing characteristics, functions, etc., and/or exceed the performance of the specified item. The substitute equipment shall be of such a physical size and weight that it will mount in the designated location without alterations to the building and the structure will carry the load. If for any reason the substituted equipment requires alterations or modification, in any form to the building and/or the structure, the costs shall be paid by the contractor and/or those requesting the substitutions.

3. Those interested in requesting a substitution shall submit a substitution request. The **substitution request will be considered if it is at the office of the Engineer eight (8) working days prior to the day of bidding. The request shall include the following:**
   a. **A statement certifying that the equipment proposed is equal to that specified; that it has the same mechanical operating characteristics, compatible dimensions, weight, electrical characteristics and meets the function and intent of the equipment named in the contract documents.**
   b. **The specification and catalog numbers of the substituted equipment.**
   c. **A pictorial and specification brochure.**
4. Because of the short bidding period, (from issuance of drawing to bid date), between the substitution request and the bid date, the designer does not have adequate time to make a full evaluation of substitute equipment. Therefore, **those requesting the substitution** must accept **full responsibility** for the items being submitted for substitution (operating characteristics, physical size, weight, output, not increase the load, etc.). If at any time during the course of construction, **even up into the final completion**, if the designer finds the equipment does not meet the design criteria, comply with the performance, etc., **those requesting the substitution and the contractor have the responsibility to remove the substituted equipment and install the specified item at their expense.** There shall be no cost assessed to the owner and/or the designer and **the replacement will not delay the completion of the project.**

B. Discrepancies between equipment specified and the intended function of equipment shall be brought to the attention of the Architect/Engineer in writing prior to bidding. Failure to report any conflict, including catalog numbers, discontinued products, etc., does not relieve the Contractor from meeting the intent of the contract documents, nor shall it change the contract cost. If the Contractor is unable to interpret any part of the plans and/or specifications, or should he find discrepancies therein, he shall bring this to the attention of the Architect/Engineer, who will issue interpretation and/or additional instructions to Bidders before the project is bid.

C. Any conflict arising from the use of **substituted equipment shall be the responsibility of the contractor,** who shall bear all costs required to make the equipment comply with the intent of the contract documents.

D. Samples may be required for non-standard or substituted items before installation during construction. Provide all samples as required.

E. No materials or apparatus may be substituted after the bid opening except where the equipment specified has been discontinued. This substitution may be made by a change order.

F. Substitute equipment shall not be bid except it is formally issued on a **Project Addendum**.

PART 3 EXECUTION

3.1 COORDINATION AND WORKMANSHIP

A. The Contractor shall at all times cooperate with other trades on the job to avoid friction and delay to the progress of work. All points in dispute shall be referred to the Architect.

3.2 SUPERVISION

A. This Contractor shall have in charge of the work at all times a thoroughly competent superintendent. Comply with Division 01 requirements.

3.3 WORKMANSHIP

A. The work under the plumbing contract shall be performed by Journeyman workers skilled in the particular trade and include all work necessary to properly complete the installation in a professional manner so as to present a neat and finished appearance.

3.4 EXAMINATION OF SITE

A. The Contractor shall visit the site of the proposed work and become familiar with the conditions affecting the work. Contractor shall verify all measurements at the building before beginning work.

3.5 SITE UTILITY SERVICES

A. Where applicable, the Contractor shall make connections to existing permanent cold water service immediately so as to provide the use of this service by other trades. Comply with Division 01 and 02 requirements.

3.6 EXISTING UTILITIES AND PIPING

A. The locations of existing concealed lines and connection points have been indicated as closely as possible from available information. The Contractor shall assume that such connection points are within a 10' radius of the indicated locations. Where connection points are not within this radius, the Contractor shall contact the Architect for a decision before proceeding or may proceed at his own expense.

B. Existing piping (hot and cold water), vent lines, drain lines, roof drains, etc., that are found to obstruct the construction area (walls, floors, and ceilings) and obstruct the removal of a wall, doorway or passageway, etc., shall be rerouted and/or relocated to clear the construction. The cost for this work shall be included as a part of the project and shall be covered in the contractor's base bid.

C. If systems of other trades or exhaust ducts fall within or obstruct construction area for whatever reason, the contractor shall relocate these items to allow construction to proceed. The cost for this work shall be included as a part of the base bid.

D. Existing extensions: piping (water, drain, vent, air, waste drain, etc.), etc., that are noted to be extended and/or retrofit (for whatever reason) to accommodate added and/or new areas or facilities shall accomplish the intent for which the system was designed. When complete, the system and/or systems shall function as if they were new. This work shall be included in the base bid for the project.

E. Cut, remove and legally dispose of selected plumbing equipment, components, and materials as indicated, including, but not limited to removal of plumbing piping, plumbing fixtures and trim, and other plumbing items made obsolete by the new work.

Note: The specifications identify each system herein mentioned and the extension and additions shall adhere to the specifications defined for this phase of construction.

3.7 LAYING OUT WORK

A. Locations of all equipment shown on the drawings, is approximate unless dimensioned. Exact locations of such items shall be determined by the Architect's representative and/or secured from special details and drawings. Verify the physical dimensions of each item of plumbing equipment to fit the available space and promptly notify the Architect/Engineer prior to roughing-in if conflicts appear. Coordination of equipment to the available space and to the access routes through the construction shall be the Contractor's responsibility.

B. The contractor **shall hand deliver to the general contractor** a written statement and/or a manufacturer's brochure on the equipment being installed at each location. The information shall give the dimensions and weight (loads) of each unit being installed. The general contractor shall forward a copy of this information to the structural engineer and obtain from him confirmation that the building structure will accommodate the loads. If there be any problem the questioning party shall notify the mechanical engineer by phone and in writing.

3.8 CONTRACTOR COORDINATION

A. In the course of installing the systems defined in the contract documents, the contractor shall closely follow the plans, details and specifications (contract documents). The system design has been a careful and laborious undertaking, with the intent purpose of producing a system and/or systems that will serve the owner well with a minimum of maintenance. Thence, the contractor shall adhere as closely as possible to the plans, details, and specifications for each system. Questions and suggestions are encouraged as the project is being assembled. If for any reason, the contractor feels to deviate from the defined information, and finds a way, to improve the system, to make the system more easily assembled, make it operate more efficiently, etc., the contractor shall suggest the change to the engineer. Systems are designed to perform a specific function; the most minute change in assembly may change the function. If the engineer agrees with the change, he will authorize the contractor to proceed. Contractor cooperation and coordination is appreciated. If the contractor proceeds on construction without the designer's authorization, it shall be reworked, in accordance to plans and specifications, which work shall be at the contractor's expense.

B. The contractor shall coordinate his construction. These systems, location of equipment, connections of services, etc. with the architectural, HVAC sector 230000, electrical 260000 documents throughout the course of construction. If problems are unsolvable contact the design engineer.

3.9 CUTTING AND PATCHING

A. All cutting and patching of new or existing construction required for installation of Plumbing systems and equipment specified in Section 220000 shall be the responsibility of the Plumbing Contractor unless otherwise noted. Comply with Division 01 for general requirements for cutting and patching.

B. All cutting shall be performed with masonry saws, core drills or similar equipment to provide neat and uniform openings.

C. All patching shall match adjacent surfaces in materials and finish. Do not endanger or damage installed work through procedures and processes of cutting and patching.

D. Arrange for repairs required to restore other work, because of damage caused as a result of plumbing installations.

E. No additional compensation will be authorized for cutting and patching work that is necessitated by ill-timed, defective, or non-conforming installations.

F. Perform cutting, fitting, and patching of plumbing equipment and materials required to:
   1. Uncover work to provide for installation of ill-timed work.
   2. Remove and replace defective work.
   3. Remove and replace work not conforming to requirements of the Contract Documents.
   4. Remove samples of installed work as specified for testing.
   5. Install equipment and materials in existing structures.

G. Upon written instructions from the Architect/Engineer, uncover and restore work to provide for Architect/Engineer observation of concealed work.

H. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

I. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

3.10 EXCAVATION AND BACKFILL

A. Contractor shall provide all necessary excavation, shoring, and backfilling required for proper installation of plumbing work inside and outside the building. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to ½ the depth of the excavation, but in no instance closer than 2'. Excavated material not required or not satisfactory for backfill shall be removed from the site and shall be disposed of in designated areas approved for surplus material storage. Grading shall be done as necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed so that the stability of the bottom and sides of the excavation is maintained.

B. Trenches shall be excavated to depth indicated or required to establish indicated slope and invert elevations and to support bottom of piping or conduit on undisturbed soil. Trenches shall be of uniform width, sufficient to provide ample working room and a minimum of 6 to 9" of clearance on both sides of pipe or conduit.

C. The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 3" or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing. Where unyielding material is encountered in the bottom of the trench, such material shall be removed 6" below the required grade and replaced with materials described below for bedding.

D. Excavation for manholes, catch basins, inlets, or similar structures shall be sufficient to leave at least 12" clear between the outer structure surfaces and the face of the excavation or support members. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

E. Bedding material shall be clean, sand-gravel mixture free from organic matter and conforming to the following gradation when tested in accordance with ASTM D 422.

U.S. Standard Sieve Size	Percent Passing
1"	100
No. 4	25-80
No. 200	0-10

F. Bedding material shall be placed to a depth of 6" over the top of piping. The bedding shall be brought up evenly on both sides of the pipe for the full length of the pipe.

G. Backfill for the remainder of the trench shall be satisfactory soil materials complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP.

H. Backfill soil materials shall be free of clay, rock or gravel larger than 2” in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.

I. Backfill to the required grade shall be placed in lifts not exceeding 6” loose thickness for compaction with hand operated machine compactors, and 8” loose thickness for other than hand operated machines otherwise specified. Each layer shall be compacted to density 105% of the adjacent soil density or as stated in the soil compaction section of these documents.

J. No underground lines shall be covered until the installation has been approved by the inspector having jurisdiction and the Owner's Representative.

K. Provide 4” thick concrete base slab support for piping less than 2' - 6" below surface of roadways. After installation and testing of piping, provide minimum 4” thick encasements (sides and top) of concrete prior to backfilling or placement of roadway subbase.

L. Bracing and shoring shall be provided where depth of excavation or character of ground render it necessary for personnel protection. Shoring shall be constructed of heavy timber planking with timber supports and shall conform with local and state safety laws and regulations.

M. Removal of bracing and shoring materials shall be done before backfilling except where necessary to insure against caving; in which case, it shall be withdrawn while backfilling is being done.

N. Provide barricades around all excavation. Barricades to be securely constructed.

O. The Contractor shall exercise extreme care while excavating in the area of utilities, carefully check for location of all possible utilities, whether shown on the drawings or not, and establish the location of all cutoff valves for ready shut-off of service in case of emergency. The Contractor shall be completely responsible for all damage to any utilities caused in excavating as well as damage to personnel and property caused by said damaged utilities whether shown on the drawings or not.

3.11 REPLACEMENT OF PAVING AND CONCRETE

A. All existing or new sidewalks, concrete paving, curbs, or asphalt paving removed or damaged by this Contractor during the period of the installation or as a result thereof, shall be replaced with like material in a manner as directed by and to the satisfaction of the Owner's Representative. Comply with Division 02 General Requirements.

3.12 OPENINGS IN PIPES

A. All temporary openings in pipes shall be capped or sealed during construction. Caps shall be removed for final connections.

3.13 PROTECTION OF MATERIALS AND EQUIPMENT

A. Contractor shall be held responsible for any and all materials and equipment to be installed under this contract and will be required to make good at his own cost any injury or damage which materials or equipment may sustain from any source or cause whatsoever before final acceptance. Comply with Division 01 requirements.

3.14 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.

B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.

C. Coordinate deliveries of plumbing materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

3.15 ACCESSIBILITY

A. Install equipment and materials to provide required access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors. Allow ample space for removal of all parts that require replacement or servicing.

B. Access doors or hatches required for servicing of mechanical equipment shall be furnished and installed as specified in the other Sections of the Specifications.

3.16 PAINTING

A. The contractor shall paint all natural gas lines exposed to the elements with 2 coats, one coat of primer and one coat of paint, yellow oil base enamel and likewise all other piping as indicated.

B. Contractor shall touch-up scratched, or damaged factory finishes of Plumbing equipment. Comply with Division 01 requirements.

C. Unless otherwise noted, all other painting of plumbing related items shall be according to Section 099000 "PAINTING".

3.17 LUBRICATION

A. Contractor shall properly lubricate all pieces of equipment before turning the building over to the Owner. Comply with Division 01 requirements.

3.18 FINAL CLEANING

A. Refer to Division 01 for general requirements for final cleaning.
B. At time of final cleanup, all fixtures and equipment shall be thoroughly cleaned and left in condition for use. All stickers, tags, shipping labels, and Manufacturers' labels shall be removed.

3.19 FIRE PENETRATION SEALS

A. All penetrations through fire rated floors and walls shall be sealed to prevent the spread of smoke, fire, toxic gas, or water through the penetration either before, during or after a fire. The fire rating of the penetration seal shall be at least that of the floor to wall into which it is installed so that the original fire rating of the floor or wall is maintained.

B. The sealant shall remain soft and pliable to allow for the removal and/or addition of piping without the necessity of drilling holes. It shall adhere to itself to allow any and all repairs to be made with the same material. It shall permit the vibration, expansion and/or contraction of piping and ducts going through the penetration without the seal cracking or crumbling.

C. When damming materials are to be left in place after the seal is complete, all such materials shall be non-flammable.

D. When sealant is injected into a penetration, the foam shall expand to surround all items within the penetration and maintain pressure against the walls of the penetration. Excess foam shall be removed. The foam shall cure within five minutes and be fire resistant at that time. No heat shall be required to further expand the foam to block the passage of fire and smoke or water.

E. All wall or floor penetration openings shall be as small as possible.

F. The foam sealant shall meet all of the fire test and hose stream test requirements of ASTM E119-73 and shall be UL classified as a Wall Opening Protective Device. The sealant shall be CHASE-FOAM, CTC PR-855 Fire Resistant Foam Sealant from Chase Technology Corporation, Huntington Station, New York 11746 or 3M Brand Fire Barrier caulk CP25, putty 303, wrap/strip FS 195 or sheet CS 195 from 3M Products Divisions, 224-4N 3M Center, St. Paul, MN 55144-1000.

3.20 TESTING, ADJUSTING, AND BALANCING

A. The plumbing systems shall be pressure tested in strict accordance with local and state codes by Journeyman with five plumber's years' experience in pressure testing. The report shall be stamped by a licensed certified plumber. The Balancing water flows in and to all equipment shall be instruments for making tests and performing work. The Plumbing Contractor shall include in his base bid all costs for tests and Balancing.

B. Testing of piping systems shall not be made until the code conditions are satisfied.

C. All instruments used for measurements shall be accurate and calibration histories for each instrument shall be available for examination. The Mechanical Engineer has the right to request instrument recalibration, or the use of other instruments, where accuracy of readings is questionable.

D. Furnish in the report a written guarantee to be effective for one year from the date of acceptance, to make any and all adjustments required to maintain comfort in all rooms and areas.

E. Reports
   1. Upon completion of testing, adjusting, and balancing of the water systems, prepare a complete and legible draft report. Submit two (2) copies of the draft report to the Plumbing Design Engineer for review.
   2. Upon verification and approval of the draft reports, prepare final reports. Four (4) typewritten, organized and formatted copies of the final report are required. Furnish one (1) copy to the Mechanical Design Engineer for his record, and the remaining three (3) copies are to be included in the Owner's Operation and Maintenance Manuals.

END OF SECTION 22 0501

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SECTION 22 0553
IDENTIFICATION FOR PLUMBING PIPES AND EQUIPMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. General conditions Division 01 and Section 220501 apply to this section.

1.2 SUMMARY

A. Includes but not limited to
   1. Furnish and install identification of equipment and piping as described in Contract Documents.

PART 2 PRODUCTS

2.1 PAINT

A. Benjamin Moore Impervo or equivalent by Paint Manufacturer approved in Architectural Painting Sections.

B. Use appropriate primer.

2.2 LABELS

A. 1/8" Laminated Black Formica with white reveal on engraving. Value tags, brass with black lettering.

B. 1½" Brass valve tags with black lettered numbers.

PART 3 EXECUTION

3.1 APPLICATION

A. Stenciling
   1. Locate identifying legends and directional arrows at following points on each piping system
      a. Adjacent to each item of equipment and special fitting.
      b. At point of entry and exit where piping goes through wall.
      c. On each riser and junction.
      d. Every 50’ on long continuous lines.
   2. Domestic Hot & Cold Water Piping Identification
      a. Identify domestic hot and cold water piping above and below ceilings with stenciled letters "HW" and "CW" respectively.
      b. Letters shall be 1” high. Provide "Direction of Flow" arrow at each stencil.
      c. Paint color shall be as specified below.

B. Painting: All pipe painting shall be provided for by the installing contractor i.e.: plumbing by the Plumbing Contractor.
   1. All piping in Mechanical room shall be painted.
   2. Paint natural gas piping outside the mechanical room.
   3. All piping label, inside and outside mechanical room.

C. Identification shall comply with, but not limited to the following:

PIPE PAINTING AND LABELING LEGEND

SERVICE & LABEL	SYMBOL	LABEL COLOR* BACKGROUND	LETTER	PIPE COLOR**
DOMESTIC COLD WATER	DCW	GREEN	WHITE	DARK ROYAL BLUE
DOMESTIC HOT WATER	DHW	YELLOW	BLACK	MAGENTA
DOM. HOT WATER RETURN	DHWR	YELLOW	BLACK	MAGENTA
SOFT COLD WATER	DSW	GREEN	WHITE	DARK ROYAL BLUE
RAINWATER	RW	GREEN	WHITE	BROWN
SANITARY SEWER	SAN	GREEN	WHITE	BROWN
NATURAL GAS	G	YELLOW	BLACK	DARK GREEN

* Ref. ANSI codes 13.1 (1981). See Specs.
** Exposed piping in mechanical rooms, boiler rooms, etc., shall be painted color indicated on chart.

D. SIZE OF LETTERS AND LENGTH OF FIELD

OD OF PIPE OR COVERING	SIZE OF LETTERS	LENGTH OF COLOR FIELD
¾” To 1½”	½”	8”
1½” To 2”	¾”	8”
2 ½” To 6”	1¼”	12”
8” To 10”	2½”	24”
Over 10”	3½”	32”

E. Paint Specification: All surfaces to be painted shall be prepared in accordance with the detailed painting specifications in the Painting Section of these specifications. Surfaces that are not subjected to temperatures higher than 212º F shall be painted as specified for the area in which they are located. Pipes, valves, or other equipment subjected to temperature above 212º F, shall be painted with heat resisting black enamel or heat resisting aluminum paint as specified below. The Owner's Representative shall designate surfaces to be painted aluminum painted at least three coats. Colors shall be selected by Owner's Representative.

F. Heat resisting black enamel shall be Sta-Black as manufactured by Pratt and Lambert Co., or Ebonite Boiler and Stack Paint as manufactured by W.P. Fuller Co. or approved equal suitable for use at temperatures of at least 45°F.

END OF SECTION 22 0553

SECTION 22 0600
SCHEDULES FOR PLUMBING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. General conditions Division 01 and Section 220501 apply to this section.

1.2 SUMMARY

A. The fixtures and equipment shown in the schedules are a part of this project and shall be included. Items in the schedules may or may not be found in the specifications but shall be included in the base bid.

B. The items stated in the schedule identify a quality of product and all substitutions shall be of that same quality.

C. If the named items have a delay in availability, notify the engineer immediately for a decision or an alternative.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. The specified equipment shall be supplied and shall include the base unit with all the parts and pieces to install it into the system where indicated.

PART 3 EXECUTION

3.1 INSTALLATION

A. The scheduled items shall be installed in strict accordance with the manufacturers' recommendations and the details on the plans. If the details conflict in any way with the manufacturer's recommendations contact the engineer.

B. The installation shall not void the equipment warranty for any reason.

END OF SECTION 22 0600

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SECTION 22 0700
PIPE AND PIPE FITTINGS

PART 1 GENERAL

1.1 SUMMARY

A. Includes but not limited to -
   1. General piping installation procedures for all piping systems.

B. Related Sections -
   1. General Conditions, Division 01, and Section 230501 apply to this Section.
   2. Type of pipe and fittings specified under each piping system.

1.2 QUALITY ASSURANCE

A. Manufacturer -
   1. Use domestic (USA) made pipe and pipe fittings on Project.

PART 2 PRODUCTS

2.1 VALVES

A. Valves of same type shall be of same manufacturer.

B. Valves shall be domestic (USA) on this project.

2.2 PIPE HANGERS

A. Adjustable, malleable iron clevis type of a diameter adequate to support pipe size.

B. Approved Manufacturers -
   1. B-Line Systems Fig. B3100
   2. Grinnell No. 260
   3. Kin-Line 455
   4. Superstrut CL-710

2.3 INSULATING COUPLINGS

A. Suitable for at least 175 PSIG WP at 250°F.

B. Approved Manufacturers -
   1. Central Plastics Co
   2. Victaulic Co
   3. Watts Regulator Co

2.4 SLEEVES

A. Sleeves shall be standard weight galvanized iron pipe, Schedule 40 PVC, or 14 gauge galvanized sheet metal two sizes larger than pipe or insulation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper erection of systems of piping in every respect.

B. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
   1. Cut piping accurately for fabrication to measurements established at site and work into place without springing or forcing.
   2. Do not use pipe hooks, chains, or perforated metal for pipe support.
   3. Remove burr and cutting slag from pipes. All pipe and tube shall be reamed to the full inside diameter of the pipe and tube.
   4. Make changes in direction with proper fittings.
   5. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.
   6. Support piping at 8' on center maximum for pipe 1¼" or larger and 6' on center maximum for pipe 1" or less. Provide support at each elbow. Install additional support as required.
   7. Suspend piping from roof trusses or clamp to vertical walls using Unistrut and clamps (except underground pipe). Laying of piping on any building member is not allowed.

C. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings. Provide accessible, ground joint unions in piping at connections to equipment.

D. Make connections of dissimilar metals with insulating couplings.

E. Provide sleeves around pipes passing through floors, walls, partitions, or structural members.
   1. Seal sleeves with plastic or other acceptable material.
   2. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete floors on grade.

F. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.

G. Install piping systems so they may be easily drained.

H. Grade soil and waste lines within building perimeter ¼" fall per ft in direction of flow or as noted on the plans.

I. Insulate water piping buried within building perimeter.

J. Do not use reducing bushings, street elbows, or close nipples.

K. Bury water piping 6" minimum below bottom of slab and encase all water lines in PVC or ABS sleeves, a minimum of 2 pipe sizes larger than water line being encased and the insulation installed on this piping. Install 2" minimum of sand around the encasement pipe.

END OF SECTION 22 0700

SECTION 22 1116
DOMESTIC WATER PIPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. General Conditions, Division 01, and Sections 220501, 230000 and 260000 as they apply to this Section.

B. Section 221116 Domestic water piping from a point 5' outside the building unless noted to the service main.

C. Section 220501-3.1 Criteria for performance of excavation and backfill.

1.2 SUMMARY

A. Includes but not limited to
   1. Furnish and install culinary water piping complete with necessary valves, connections, and accessories inside building and connect with outside utility lines 5' from building perimeter.
   2. Perform excavating and backfilling compactors required by work of this Section.

1.3 SUBMITTALS

A. Quality Control
   1. Submit written report of sterilization test to Architect.

PART 2 PRODUCTS

2.1 MANUFACTURING

A. All pipe and fittings shall be domestic (USA) manufactured.

B. All valves shall be domestic (USA) manufactured.

2.2 PIPE

A. Type K copper for piping underground or beneath concrete slab. ¾" minimum under slabs. Trap primer supplies shall be ½".

B. Type L hard drawn copper for above ground applications.

C. Wirsbo Aquapex Tubing & Manifold. (Engel Method Extrusion Process).

D. Viego Pureflow PEX tubing and Manabloc

E. Raupex Pipe

2.3 FITTINGS

A. Wrought copper.

B. ProPEX fittings.

C. PEX Press fittings

D. Everlock+fittings

2.4 CONNECTIONS

A. Sweat copper type with 95/5 or 96/4 Tin-Antimony solder.

B. Joints under slabs, if allowed by local codes, shall be brazed.

2.5 BALL VALVES

A. Use ball valves exclusively unless otherwise specified. Ball valves shall be by single manufacturer from approved list below. Valves shall be for 150 PSI SWP.

B. Approved Manufacturers
   1. Nibco-Scott T595 or S595 or equal by
   2. ConBraCo (Apollo)
   3. Crane
   4. Hammond
   5. Stockham
   6. Watts

2.6 STOP & WASTE VALVES

A. Approved Manufacturers
   1. Mark II Oriseal stop & waste valve H15134 by Mueller
   2. Buffalo screw type curb box H-10350 complete with lid and H-10349 enlarged base by Mueller.

2.7 BACKFLOW PROTECTIONS

A. Approved Manufacturers-
   1. Watts No. 909 or No. 009AQ - R.P. Backflow Preventer.
   2. FEBCO Model No. 825 or Model No. 880 - R.P. Backflow Preventer.
   3. Wilkins Model No. 550 - R.P. Backflow Preventer.
   4. ConBraCo.

2.8 COMBINATION PRESSURE REDUCING VALVE/STRAINER

A. Integral stainless-steel strainer, or separate 'Y' strainer installed upstream of pressure reducing valve.

B. Built-in thermal expansion bypass check valve.

C. Approved Manufacturers
   1. Watts U5B or equal by
   2. Cash Valve
   3. Spencer
   4. Wilkins

2.9 INSULATING COUPLINGS

A. Suitable for at least 175 PSIG WP at 250° F.

B. Approved Manufacturers -
   1. Central Plastics Co
   2. Victaulic Co
   3. Watts Regulator Co

2.10 SLEEVES

A. Sleeves shall be standard weight galvanized iron pipe, Schedule 40 PVC, or 14 gauge galvanized sheet metal two sizes larger than pipe or insulation.

2.11 MIXING VALVES

A. For 110° F 45° C Service.
   1. Water inlets with stop valves, check valves, and removable strainers.
   2. Water outlet with volume control valve and direct reading dial thermometer.
   3. Flow: 1 GPM with maximum 5 psi pressure drop.

B. Approved Manufacturers:
   1. Watts
   2. Leonard
   3. Chicago
   4. Sloan
   5. Webstone
   6. Kohler

PART 3 EXECUTION

3.1 INSTALLATION

A. Install piping under slabs without joints where possible.

B. Locate cold water lines a minimum of 6” from hot water line.

C. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper erection of systems of piping in every respect.

D. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
   1. Cut piping accurately for fabrication to measurements established at site and work into place without springing or forcing.
   2. Do not use pipe hooks, chains, or perforated metal for pipe support.
   3. Remove burr and cutting slag from pipes. All pipe and tube shall be reamed to the full inside diameter of the pipe and tube.
   4. Make changes in direction with proper fittings.
   5. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.
   6. Support piping at 8’ on center maximum for pipe 1¼” or larger and 6’ on center maximum for pipe 1” or less. Provide support at each elbow. Install additional support as required.
   7. Suspend piping from roof trusses or clamp to vertical walls using Unistrut and clamps (except underground pipe). Laying of piping on any building member is not allowed.

E. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings. Provide accessible, ground joint unions in piping at connections to equipment.

F. Make connections of dissimilar metals with insulating couplings.

G. Provide sleeves around pipes passing through floors, walls, partitions, or structural members.
   1. Seal sleeves with plastic or other acceptable material.
   2. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete floors on grade.

H. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.

I. Install piping systems so they may be easily drained.

J. Grade soil and waste lines within building perimeter ¼" fall per ft in direction of flow or as noted on the plans.

K. Insulate water piping buried within building perimeter.

L. Do not use reducing bushings, street elbows, or close nipples.

M. Bury water piping 6" minimum below bottom of slab and encase all water lines in PVC or ABS sleeves, a minimum of 2 pipe sizes larger than water line being encased and the insulation installed on this piping. Install 2" minimum of sand around the encasement pipe.

3.2 FIELD QUALITY CONTROL

A. Before pipes are covered, test systems in presence of Architect at 100 psi hydrostatic pressure for two hours and show no leaks.

B. Sterilize domestic water system with solution containing 250 parts per million minimum of available chlorine. Introduce chlorinating materials into system in manner approved by Architect. Allow sterilization solution to remain for 24 hours and open and close valves and faucets several times during that time.

C. After sterilization, flush solution from system with clean water until residual chlorine content is less than 0.2 parts per million.

D. Water system will not be accepted until negative bacteriological test is made on water taken from system. Repeat dosing as necessary until such negative test is accomplished.

END OF SECTION 22 1116

SECTION 22 1119
DOMESTIC WATER PIPING SPECIALTIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. General conditions Division 01 and Section 220501 apply to this section.

1.2 SUMMARY

A. Includes but not limited to
   1. Furnish and install items specified in this Section and/or described in Contract Documents.
   2. All pipe, fittings, and valves shall be domestic (USA) manufactured.

PART 2 PRODUCTS

2.1 FLOW CONTROL FITTINGS

A. Vandal proof type and fit faucet spout of fixture used. Flow shall be controlled as required by local codes.

2.2 CONDENSATE DRAINS

A. Provide Type M copper for condensate drains from air handling units, fan coil units, furnace coils, and cooler/freezers. Support piping and protect from damage.

B. Provide schedule 40 PVC for condensate from high tech furnaces, boiler, and water heater.

C. Install 3” deep seal, vented water trap adjacent to coil connection.

D. If condensing equipment is installed without a clarifier, the condensate lines shall be PVC pipe and fitting. Secure all piping.

2.3 CONDENSATE PUMP

A. Rated at 225 gph at 15’ total head. Complete with one gallon polystyrene tank with pump and automatic float control. 1/5 hp, 120 volt, one phase, 60 Hertz.

B. Condensate piping shall be Type M copper.

C. Approved Manufacturers
   1. Little Giant #VCL-45ULS

2.4 PRESSURE GAUGES

A. Cast aluminum case.

B. Chrome plated ring

C. Clear glass window

D. Phosphor bronze alloy steel bourdon tube

E. ½% scale range accuracy

F. 4½” diameter dial face

G. Range 0 to 100 psig.

H. Liquid Filled.

I. Approved Manufacturers
   1. Trerice
   2. Swagelok
   3. Weiss
   4. Ashcraft

2.5 BRASS GAUGE COCKS

A. Approved Manufacturers
   1. Ashcroft
   2. Weiss
   3. Trerice
   4. Swagelok

2.6 WATER HAMMER ARRESTERS

A. Provide and install a water hammer arrester at each hot and cold water connection and battery of fixtures.

B. Water hammer arresters shall be sized in accordance with PDI WH-201, precharged, suitable for operation in temperature range 100 to 300º F, and maximum 250 psig working pressure.

C. Water hammer arrestors shall be constructed of stainless steel.

D. Approved Manufacturers:
   1. Josam
   2. Wade
   3. Zurn
   4. J.R. Smith

PART 3 EXECUTION

3.1 INSTALLATION

A. Connect gauges to pipe with ¼” connections ball valve.

END OF SECTION 22 1119

SECTION 22 1316
FACILITY SANITARY WASTE AND VENT PIPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. General conditions Division 01 and Section 220501 apply to this section.

B. Section 220501-3.1 Criteria for performance of excavation and backfill.

C. Section 221313 Sewage piping from 5' out from building to main.

D. Section 022200 and 221322 Storm Drain piping.

E. Section 221313-3.1-G Installing of Copper roof jacks.

F. Section 221313-3.1-G2 Furnishing and installing of lead roof jacks.

G. Section 078400 Quality Fire Stop Material.

1.2 SUMMARY

A. Includes but not limited to
   1. Furnish and install soil, waste, and vent piping systems within building and connect with outside utility lines 5' out from building where applicable.
   2. ASTA Testing and Material Standards No. 74, 564, 891, 2235, 2231, 2321, etc.
   3. Perform excavation and backfill required by work of this Section.

B. Products furnished but not installed under this section.
   1. All roof flashings.
   2. Verify with roofing contractor for type of roof flashing to match roofing material and warranty.

PART 2 PRODUCTS

2.1 MANUFACTURING

A. All pipe and fittings shall be domestic (USA) manufactured.

2.2 BURIED LINES

A. Service weight, single-hub type cast iron soil pipe and fittings meeting requirements of ASTM A 74-87, "Specification for Cast Iron Soil Pipe & Fittings".

B. Plastic pipe conforming to IAPMO and ASTM specifications will be acceptable where permitted by local code (ABS or PVC schedule 40 pipe).

C. Service Weight, no-hub, cast iron soil pipe or as approved by local code.

D. Joint Material
   1. 50% oakum and 50% lead, well calked.
   2. Rubber gaskets meeting requirements of ASTM C 564-88, "Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings".
   3. No-Hub Pipe- Neoprene gaskets with stainless steel cinch bands.
   4. As recommended by the pipe manufacturer of plastic pipe.

2.3 ABOVE GRADE PIPING & VENT LINES

A. Same as specified for buried lines except schedule 40 or Galvanized steel piping may be used above grade.

B. Vent lines 2½" or smaller may be Schedule 40 galvanized steel.

C. All ABS or PVC lines and fittings above finished grade shall be insulated for noise abatement.

D. Plastic pipe conforming to IAPMO and ASTM specifications will be acceptable where permitted by local codes.

E. Joint Material
   1. Bell & Spigot Pipe - 50% oakum and 50% lead, well calked, or rubber gaskets meeting requirements of ASTM C 564-88, "Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings".
   2. No-Hub Pipe - Neoprene gaskets with stainless steel cinch bands.
   3. Galvanized Pipe - Screwed Durham tarred drainage fittings.
   4. Cleaning (Primers) and solvent cement (GWE) shall be installed as per manufacturer's recommendations.
   5. ABS or PVC - Glued fitting as per manufacturer's recommendations.

2.4 BURIED AND ABOVE GRADE ACID WASTE AND VENT LINES

A. Schedule 40 polypropylene acid waste pipe, manufactured to dimensions and tolerances of ASTM F 1412. The pipe shall be fire retardant polypropylene material conforming to ASTM D4101.

B. Fitting shall be schedule 40 polypropylene, manufactured to dimensions as per ASTM F1412. The polypropylene material shall be fire retardant and conform to ASTM D4101.

C. Joining methods between the pipe and fittings shall be mechanical joint, meeting ASTM F 1412 or electrofusion to produce a hermetically sealed joint, conforming to ASTM 1290.

D. All acid waste lines and fittings above floor shall be insulated for noise abatement.

E. Approved products
   1. Zurn
   2. Orion

2.5 ABOVE GRADE ACID WASTE AND VENT LINES LOCATED IN PLENUM OR FIRE RATED ROOM OR STRUCTURE.

A. Schedule 40 polyvinylidene Fluoride (PVDF) acid waste pipe, manufactured to dimensions and tolerances of ASTM F1672. The pipe shall be fire resistant Polyvinylidene Fluoride material conforming to ASTM D3222.

B. Fitting shall be schedule 40 polyvinylidene Fluoride, manufactured to dimension per ASTM F1673. The polyvinylidene Fluoride (PVDF) material shall be fire resistant and conform to ASTM D3311 and F1673.

C. Joining method between the pipe and fittings shall be mechanical joint, meeting ASTM F1673.

D. Approved products
   1. Zurn
   2. Orion

E. All acid waste lines and fittings shall be insulated with an approved insulation that meets the flame smoke rating for plenum or fire rated rooms or structure. If necessary, the insulation shall be wrapped with a plenum rated tape.

PART 3 EXECUTION

3.1 INSTALLATION

A. Do not calk threaded work, all piping must be solid, which will be installed in soil and hub fittings.

B. Slope horizontal pipe at ¼”/ft.

C. Place cleanouts as follows:
1. Where shown on Drawings and near bottom of each stack and riser.
2. At every 90º change of direction for horizontal lines.
3. Every 100’ of horizontal run.
4. Extend cleanout to accessible surface. Do not place cleanouts in carpeted floors. In such locations, use wall type cleanouts.
5. Meet all code requirements for cleanouts.
6. All cleanout to grade and floor cleanouts shall be nickel bronze tops unless otherwise stated on the drawings.

D. Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have seal trap in connection with complete venting system, so gasses pass freely to atmosphere with no pressure or syphon condition on water seal.

E. Vent entire waste system to atmosphere. Discharge 14” above roof. Join lines together in fewest practicable number before projecting above roof. Set back vent lines so they will not pierce roof near edge or valley.

F. Use torque wrench to obtain proper tension in cinch bands when using hubless cast iron pipe. Butt ends of pipe against centering flange of coupling.

*** Roof systems other than concrete roof tile ***

G. Vent pipes passing through the roof are to have a roof flashing, fitted snugly around pipes and calk between flashing and pipe with flexible waterproof compound. Flashing base shall be at least 24 in². Coordinate with roofing contractor to match flashing to roofing materials.
1. Consult roofing contractor for exact type of flashings. Coordinate with the engineer and the roofing contractor for this information.

H. Refer to section 220529 for hangers and support of this piping.

3.2 FIELD QUALITY CONTROL

A. **Before piping is covered, conduct tests for leaks and defective work.** Notify Architect prior to testing. Correct leaks and defective work. Fill waste and vent system to roof level with water, 10’ minimum, and show no leaks for two hours.

END OF SECTION 22 1316

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SECTION 22 1320
FACILITY NATURAL GAS SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. General conditions Division 01 and Section 220501 apply to this section.

1.2 SUMMARY

A. The gas contractor shall provide and install the gas piping (Natural Gas) from the point of service (outlet of gas meter) to the last piece of gas equipment being served, as shown on the plans.

B. The gas piping shall be supported as outlined in Section 220529.

C. Coordinate the piping with the serving utility. The gas contractor shall provide under this contract all the valves, connection components, etc. required to connect all the gas equipment.

D. If metered the gas utility shall provide the gas service lines the meter (Natural Gas), with the connections being made there to.

E. If the meter requires a base or protection from traffic, the gas contractor shall so provide.

1.3 QUALITY ASSURANCE

A. Qualifications
   1. Welders shall be certified and bear evidence of certification 30 days prior to commencing work on project. If there is doubt as to proficiency of welder, Owner's Representative may require welder to take another test. This shall be done at no cost to Owner. Certification shall be by Pittsburgh Testing Laboratories or other approved authority.

PART 2 PRODUCTS

2.1 MANUFACTURING

A. All pipe and fittings shall be domestic (USA) manufactured.

B. All valves shall be domestic (USA) manufactured.

2.2 FOR PIPING AND INSTALLATION SEE SECTIONS

A. Meet requirements of ASTM A 53-89a, "Specification for Pipe, Steel, Black & Hot-Dipped Zinc-Coated Welded & Seamless".

B. Carbon steel, butt welded, Schedule 40 black steel pipe.

2.3 FITTINGS

A. Black Pipe
   1. Welded forged steel fittings meeting requirements of ASTM A 234-89a, "Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures", or standard weight 150 lbs, malleable iron screwed.

2.4 VALVES

A. 125 psi bronze body ball valve, UL listed.

B. Approved Manufacturers & Models
   1. ConBraCo - "Apollo" series 80-100

2. Jenkins - FIG-30-A
3. Jomar - Model T-204
4. McDonald - 3410
5. PGL Corp - "Red Cap" gas ball valve
6. Watts - Model B-6000-UL

2.5 EARTHQUAKE ACTUATED GAS SHUT-OFF VALVES

A. Aluminum Body Valve.

B. Stainless Steel Ball Shut-off.

C. Manual reset.

D. V.L., IAPMO, and A.6.A listed.

E. Approved Manufacturers:
1. Safe-T-Quake.
2. Koso
3. Quakemaster.

2.6 GAS PRESSURE REGULATORS

A. Approved Manufacturers
1. Equimeter
2. Fisher
3. Pietro Fiorentini-Governor

PART 3 EXECUTION

3.1 FOR INSTALLATION ABOVE AND BELOW GRADE SEE SECTIONS

A. Pipe installed underground, through air plenums, in walls, and pipes 2½" and larger shall be welded pipe and fittings. Other pipe may have screwed or welded fittings.

B. Wrap and lay underground pipe in accordance with local gas utility company regulations and specifications.

C. Install gas cocks on lines serving boilers, furnaces, duct heaters, and water heaters adjacent to boiler, furnace, or heater on outside of boiler, furnace, or heater cabinet and easily accessible.

D. Do not use flexible pipe connections to boilers, furnaces, duct heaters, or hot water heaters.

E. Install dirt leg with pipe cap, 6" long minimum, on each vertical gas drop to heating equipment.

F. Use fittings for changes of direction in pipe and for branch runouts.

G. Protection Coatings: All underground steel pipes shall be wrapped with "Scotchrap" NP. 50 tape to give not less than two complete layers on the entire underground piping system. Factory wrapped pipe in accordance with American Water Works Standard, or X-tru-Coast Plastic coated pipe will be acceptable.

H. Paint main gas valve red and label "Main Gas Shut-off" with a permanent label.

I. Install earthquake activated gas shut-off valve downstream of meter before entering building with gas line (required only in seismic zones 3 and 4).

END OF SECTION 22 1320

SECTION 22 4200
PLUMBING FIXTURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. General conditions section 01 and section 220501 apply to this section.

1.2 DESCRIPTION

A. A schedule of plumbing fixtures and equipment has been set-up on the contract documents. These units have been established as a standard for the systems being installed.

B. The manufacturer of the specified equipment directs the method of mounting the equipment and these directions shall be followed for a valid warranty.

C. The sizes capacity and method of connection shall comply with the manufacturer's directives. Any change there in places the warrantee responsibility on the contractor.

1.3 SUBSTITUTIONS

A. See section 220501-2.2 for an approved substitution, Part A thru H.

PART 2 PRODUCTS

2.1 GENERAL

A. Interior exposed pipe, valves, and fixture trim shall be chrome plated.

2.2 WATER CLOSETS

A. Standard Fixture
   1. Approved Manufacturers
      a. American Standard
      b. Zurn
      c. Kohler
      d. Sloan

B. Handicap Fixture
   1. 18" rim height.
   2. Approved Manufacturers
      a. American Standard
      b. Zurn
      c. Kohler
      d. Sloan

C. Seat
   1. Provide split front type with check hinge.
   2. Approved Manufacturers for Standard, Handicapped and Nursery Fixtures -
      a. Church
      b. Beneke Corporation
      c. Bemis
      d. Kohler
      e. Olsonite
      f. American Standard
   3. Approved Manufacturers for Nursery Fixtures
      a. American Standard
      b. Zurn
      c. Kohler

D. Supply Pipe & Stop
   1. Provide stuffing box, brass stems and chrome plating
   2. Approved Manufacturers
      a. Eastman
      b. Brass Craft
      c. Dearborn

E. Flush Valves
   1. Approved Manufacturers
      a. Sloan
      b. Zurn
      c. American Standard

   2. Flush Valve Filters
      a. SFOGI “Dirt Grabber” South Fork Manufacturing

F. Water Closet Supports
   1. J.R. Smith
   2. Zurn
   3. Josam
   4. Wade
   5. Watts Drainage Products

2.3 URINALS

A. Fixture
   1. Approved Manufacturers
      a. American Standard
      b. Zurn
      c. Kohler
      d. Sloan

B. Flush Valve
   1. Approved Manufacturers
      a. Sloan
      b. Zurn
      c. American Standard
   2. Flush Valve Filters
      a. SFOGI “Dirt Grabber” South Fork Manufacturing

C. Urinal Supports
   1. J.R. Smith
   2. Zurn
   3. Josam
   4. Wade
   5. Watts Drainage Products

2.4 LAVATORIES

A. Self-Supporting Fixture
   1. Size 20" x 18"
   2. Approved Manufacturers
      a. American Standard
      b. Zurn
      c. Kohler
      d. Sloan

B. Countertop Fixture
   1. Size 20" x 17" (maximum)
   2. Approved Manufacturers
      a. American Standard
      b. Zurn
      c. Kohler
      d. Sloan

C. Fittings
   1. Faucet and Drain
      a. Approved Manufacturers
         1) American Standard
         2) Moen Commercial
         3) Symmons
         4) Delta Commercial
         5) Kohler
         6) Zurn
         7) Sloan
   2. Supply pipes with stops
      a. Provide stuffing box, brass stems and chrome plating.
      b. Approved Manufacturers
         1) Eastman
         2) Brass Craft
         3) Dearborn
         4) Zurn
   3. Trap
      a. 17 ga tube "P" trap, chrome plated
      b. Approved Manufacturers
         1) Zurn
         2) Dearborn
         3) McGuire
         4) Keeney Manufacturing
         5) Watts

D. All handicap accessible lavatories shall have traps and hot and cold water supplies insulated with flexible vinyl insulation manufactured by Truebro, Inc. Handi Lav-Gaurd Model No. 102W or No. 105W (no equals accepted).

E. Lavatory Supports for wall hung lavatories.
   1. J.R. Smith
   2. Zurn
   3. Josam
   4. Wade
   5. Watts Drainage Products

2.5 HANDICAPPED LAVATORIES

A. Self-Supporting Fixture
   1. Size - 20" x 27"
   2. Approved Manufacturers
      a. American Standard
      b. Zurn
      c. Kohler
      d. Sloan

B. Fittings
   1. Faucet & Drain
      a. Approved Manufacturers
         1) American Standard
         2) Symmons
         3) Moen Commercial
         4) Kohler
         5) Zurn
         6) Sloan
   2. Supplies Pipe with stops
      a. Provide stuffing box, brass stems and chrome plating.
      b. Approved Manufacturers
         1) Eastman
         2) Brass Craft
         3) Dearborn
         4) Zurn
   3. Traps
      a. 17 ga tube "P" trap, chrome plated
      b. Approved Manufacturers
         1) Watts
         2) Dearborn
         3) McGuire
         4) Keeney Manufacturing

C. All handicap accessible lavatories shall have traps and hot and cold water supplies insulated with flexible vinyl insulation manufactured by Truebro, Inc. Handi Lav-Gaurd Model No. 102W or No. 105W (no equals accepted).

D. Lavatory supports for wall hung lavatories.
   1. J.R. Smith
   2. Zurn
   3. Josam
   4. Wade
   5. Watts Drainage Products

2.6 SERVICE SINK

A. Fixture
   1. Floor Type
   2. Approved Manufacturers
      a. American Standard
      b. Zurn
      c. Fiat Products Inc
      d. Acorn
      e. Kohler
      f. Stern-Williams

B. Fittings
   1. Faucet
      a. Mounting height of 36 to 42” (see plans)
      b. Provide a 48” hose and wall clamp.
      c. Approved Manufacturers
         1) American Standard
         2) Zurn
         3) Moen Commercial
         4) Fiat Products Inc
         5) T & S Brass
         6) Kohler
         7) Chicago Faucets
   2. Drain and Strainer
      a. Approved Manufacturers
         1) American Standard
         2) Zurn
         3) Kohler
         4) Fiat Products, Inc.
   3. Trap
      a. Cast iron - “Deep Seal”

2.7 STAINLESS STEEL SINKS

A. Fixture
   1. Self-rimming, 18 gauge stainless steel, satin finish.
   2. Approved Manufacturers
      a. One, two or three Compartment
         a. Elkay
         b. Just
         c. Moen

B. Fittings
   1. Faucet and Drains
      a. One. two or three compartment sinks
      b. Approved Manufacturers
         a. American Standard
         b. Moen Commercial
         c. Zurn
         d. Elkay
         e. Kohler
         f. Symmons
   2. Waste
      a. Approved Manufacturers
         a. Dearborn
         b. Elkay
         c. Kohler
   3. Supply pipes with stops
      a. Provide stuffing box, brass stems, and chrome plating.
      b. Approved Manufacturers
         a. Brass Craft
         b. Dearborn
         c. Eastman
         d. Zurn

4. Trap
   a. 17 gauge tube "P" trap, chrome plated
   b. Approved Manufacturers
      a. Watts
      b. Dearborn
      c. Zurn
      d. Keeney Manufacturing
      e. McGuire

2.8 FLOOR DRAINS

A. Approved Manufacturers
   1. Josam
   2. J.R. Smith
   3. Wade
   4. Zurn
   5. Watts Drainage Products

2.9 HYDRANTS

A. Provide with integral anti-siphon device.

B. Approved Manufacturers (Exterior Frost Free)
   1. Zurn
   2. Wade
   3. Smith
   4. Josam
   5. Woodford
   6. J.R. Smith
   7. Watts Drainage Products

C. Approved Manufactures (Interior)
   1. Acorn
   2. Chicago Faucet
   3. Woodford

2.10 CLEANOUTS:

A. Furnish wall cleanouts with chrome wall cover and brass or stainless steel screw.
   1. Finish Floors - Wade W-6000
   2. Resilient Flooring - Wade W-6000-T
   3. Finished Wall - Wade W8460R
   4. Exposed Drain Lines - Wade W-8650A
   5. General Purpose - Wade W-8550A
   6. Approved Alternate Manufacturers for Cleanouts
      a. Josam
      b. Smith
      c. Zurn
      d. Watts Drainage Products

2.11 FLOOR SINK

A. 8” square top, medium receptor cast iron body with flanged receptor, acid resistant coated interior, and acid resistant coated half grate. Aluminum sediment bucket.

B. Approved Manufacturers
   1. Commercial Enameling
   2. J.R. Smith
   3. Josam
   4. Wade
   5. Zurn
   6. Watts Drainage Products

2.12 WORK ROOM SINK

A. Fixture
   1. Self-rimming, 18 gauge SS with satin finish.
   2. Approved Manufacturers
      a. Elkay
      b. Just
      c. Moen

B. Fittings
   1. Faucet
      a. Approved Manufacturers
         1) American Standard
         2) Moen Commercial
         3) Kohler
         4) Elkay
         5) Symmons
         6) Zurn
         7) Chicago Faucets
   2. Supply with Stops
      a. Provide stuffing box, brass stem, and chrome plating.
      b. Approved Manufacturers
         1) Eastman
         2) Brass Craft
         3) Dearborn
         4) Zurn
   3. Waste
      a. Approved Manufacturers-
         1) Elkay
         2) Kohler
         3) Zurn
         4) Dearborn
   4. Trap
      a. 17 gauge tube "P" trap, chrome plated
      b. Approved Manufacturers
         1) Watts
         2) Dearborn
         3) Zurn
         4) Keeney Manufacturing
         5) McGuire

2.13 WALL MOUNTED VITREOUS CHINA DRINKING FOUNTAIN

A. Include waste strainer integral with receptor.

B. Exposed metal trim shall be chrome plated brass.

C. Approved Manufacturers
   1. American Standard
   2. Crane
   3. Kohler

2.14 SHOWERS

A. Column shower approved manufactures.
   1. Bradley
   2. Acorn

B. One piece seamless acrylic/fiberglass approved manufacturers.
   1. American Standard
   2. Aquatic Products
   3. Kohler

C. Shower valves approved manufacturers.
   1. American Standard
   2. Bradley
   3. Delta Commercial
   4. Moen Commercial
   5. Kohler
   6. Symmons
   7. Powers

2.15 WASHING MACHINE OUTLET BOX

A. 16 ga. steel with corrosion resistant epoxy finish.

B. Approved Manufacturers
   1. Guy Gray Manufacturing, Co., Inc.
   2. Symmons Industries, Inc.

2.16 EMERGENCY EQUIPMENT

A. Drench showers, eye wash.

B. Approved Manufacturers
   1. Bradley
   2. Guardian Equipment
   3. Haws
   4. Acorn Safety
   5. Encom

2.17 ROOF/OVERFLOW DRAINS

A. Cast iron body, cast iron mushroom dome, sump receiver, and under deck clamps.

B. Approved Manufacturers
   1. Josam Co.
   2. J.R. Smith
   3. Wade
   4. Zurn
   5. Watts Drainage Products

2.18 TRENCH DRAIN

A. Approved Manufacturers
   1. ACO Plymer Products
   2. Watts Drainage Products
   3. Polydrain
   4. Wade
   5. J.R. Smith
   6. Zurn

PART 3 EXECUTION

3.1 INSTALLATION

A. Install fixtures including traps and accessories with accessible stop or control valve in each hot and cold water branch supply line.

B. Mount fixtures per architectural elevations unless noted otherwise.

C. Make fixture floor connections with approved brand of cast iron floor flange, soldered or caulked securely to waste pipe.

D. Make joints between fixtures and floor flanges tight with approved fixture setting compound or gaskets.

E. Calk between fixtures and wall and floor with white butyl rubber non-absorbent caulking compound. Point edges.

F. All wall hung fixtures shall be securely attached to carriers, fixture hanger or arm shall be supported free of finished wall.

3.2 ADJUSTING, CLEANING

A. Polish chrome finish at completion of Project.

B. Clean sediment from aerators.

END OF SECTION 22 4200

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DIVISION 23 HEATING, VENTILATION AND AIR CONDITIONING MECHANICAL

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SECTION 23 0501
COMMON HVAC REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to work of this section.

B. Related Sections: Refer to "Electrical Requirements for Heating-Ventilation and Air-Conditioning (HVAC) Equipment" Section 230000 for basic electrical requirements for all mechanical equipment. Special and specific electrical requirements are specified within each respective equipment specification section. See Sections 220000 Plumbing and Section 260000 Electrical.

1.2 SCOPE OF WORK - GENERAL

A. This section specifies the basic requirements for HVAC installations and includes requirements common to more than one section of. It expands and supplements the requirements specified in sections of Division 01.

B. The work covered by the HVAC Sections of the Specifications shall include the furnishing of all materials, labor, transportation, tools, permits, fees, inspections, utilities and incidentals necessary for the complete installation of all mechanical work required in the Contract Drawings.

C. It is the intent of the Contract Documents to provide an installation complete in every respect. In the event that additional details or special construction is required for work indicated or specified under this section of work or work specified in other sections, it shall be the responsibility of the Contractor to provide all material and equipment which is usually furnished with such systems in order to complete the installation, whether mentioned or not.

D. The Contractor shall review all Contract Drawings and Specifications and include in his bid any work specifically as being performed in the HVAC. The Contractor shall be responsible for all work performed by his subcontractors.

1.3 DEFINITIONS

A. "Provide" shall mean "furnish and install complete and ready for intended use."

B. "Indicated" shall mean "indicated on drawings".

C. "Concealed" shall mean "hidden from sight as in trenches, chases, furred spaces or hung ceilings.

D. "Exposed" shall mean "not concealed", as defined above.

E. "Noted" shall mean "noted on drawings or in specifications".

F. "Contractor" also referred to as "this Contractor" or "the Contractor", shall mean "HVAC".

1.4 CODES AND STANDARDS

A. All mechanical work shall be in strict accordance with the most current edition of the International Building Code (IBC), International Mechanical Code (IMC), Uniform Plumbing Code (UPC), National Fire Protection Association (NFPA), International Fire Code (IFC), National Electrical Code (NEC), Energy Code IECC and ASHRAE-90.1, and all applicable state and local codes, laws and ordinances.

1.5 PERMITS AND FEES

A. The Contractor shall obtain and pay for all required permits and fees necessary to fully complete all work included in the Contract Drawings and Specifications.

1.6 CONSTRUCTION OBSERVATIONS

A. During the course of construction of this project, the engineer shall visit the project site periodically on an as-needed basis. The construction observation intervals may vary depending on the progress and/or stage of construction and whether piping and/or ductwork, etc., is being placed below grade and/or concealed, surface mounted items, setting of equipment, equipment connections, etc. However, written field questions are encouraged and welcomed throughout the course of construction and shall be answered promptly in writing, to keep the project construction on schedule. The project foreman should have the building plans, construction schedules, etc., affixed in mind, so the mechanical systems being assembled, the setting of equipment, of parts and pieces, related to the project are anticipated, to prevent delays or emergencies.

1. The engineer shall make one (1) final inspection. The contractor shall notify the engineer that the installation is complete, i.e., the systems are operating and have been tested and balanced, and everything is complete and operational, all equipment connections have been made and the owner's representatives have been trained. At this time the engineer, the contractor, and the owner's representative shall schedule a time to walk the project for evaluation, and record in writing the items found to be incomplete. The contractor shall make the corrections within one (1) week after this inspection. If at the conclusion of the observation tour the owner and engineer determine that additional visits are required to complete this project.

B. On extra visits, the contractor shall report to the engineer that all systems are complete, and the project is ready for the owner's acceptance.

1.7 INTENT AND INTERPRETATION

A. The Drawings and Specifications are intended to supplement each other, and any details contained in one and not the other shall be included as if contained in both. Items not specifically mentioned in the specifications or noted on the drawings, but which are obviously necessary to make a complete working installation shall be included.

B. The drawings are partly diagrammatic and do not necessarily show the exact location of all new piping and existing utilities, unless specifically dimensioned.

C. Riser and other diagrams are schematic only and do not necessarily show the physical arrangement of the equipment. They shall not be used for obtaining quantities or lineal runs of piping.

D. All grilles, fixtures or other pieces of equipment shall be centered on windows, wall spaces, or other items, unless specifically dimensioned otherwise.

E. The location of the ductwork shall be checked to determine that it clears all openings and structural members; that it may be properly concealed; and that it clears cabinets, lights and equipment having fixed locations.

F. HVAC drawings shall serve as the working drawings for this portion of the work, but the Contractor shall refer to the Architectural, Structural, Plumbing and Electrical drawings for additional detail affecting the installation of his work. Architectural drawings shall take precedence over the HVAC drawings if any dimensional discrepancies exist.

G. The approximate location of each item is indicated on the drawings. These drawings are not intended to give complete and exact details in regard to location. Exact locations are to be determined by actual measurements at the building and will in all cases be subject to the approval of the Architect and he reserves the right to make any reasonable changes in the locations indicated without additional cost.

H. The contractor shall not make a change in a system, system layout, and/or equipment, except he receives written approval or drawing over the signature of the engineer.

1.8 SUBMITTAL OF EQUIPMENT FOR APPROVAL

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 01 General Requirements for submittal definitions, requirements and procedures.

B. Engineer Approved Shop Drawings of Data on Product and/or Equipment Being Installed in this Project: After the contract is awarded the project and prior to the production of the specified equipment, the manufacturer shall have in hand an engineer approved shop drawing on that equipment being installed on this project. The manufacturer shall produce the product to comply with approved data. A brief description of submission to the engineer for evaluation is given below. Refer to identified sections for detailed submittal requirements.

1. The **contractor shall submit one set of shop drawings** in a single binder (as stated in Section 1.11). From the submitted data the Design Engineer will review, make comments on or disapprove the submittals. The submittal will then be returned to the contractor via e-mail. Upon receipt of the e-mail, the contractor shall produce and assemble the required sets of shop drawings, operation and maintenance material, forming a manual that can be used by the owner in operating and maintaining the equipment.

C. Confirm equipment approved for the project.

1. Confirm that the equipment is approved for installation. It must be defined as to name, catalog number or both in the bid documents, which includes the published addendums. **If not approved, do not submit**.
2. Each unit shall state the name of the equipment manufacturer (name, address, phone, email, etc.) catalog number, size, physical dimensions and weight, energy characteristics (electrical and/or fuel), operating characteristics, materials from which constructed, any special conditions that may apply to the construction of the unit, etc.
3. The equipment must explain and define in detail the components that make-up the unit, so the owner and engineer can determine, define the replaceable parts during the life of the unit.
4. Complete operating instruction, normal maintenance recommendations, start-up procedures, etc.
5. In general, the contractor shall acquaint himself with the equipment to confirm that it can be installed as shown on the plans and from his experience perform the indicated function in the system where installed.

6. In the course of reviewing the shop drawings, **the Contractor shall confirm the energy usage** (gas, power, air, water, drains, etc.) and determine if these services are available at the equipment characteristics. Namely: confirm voltage, phase, etc., with the electrical contractor. Natural gas available with the plumber, also drains, water (hot and cold) pipe sizes, etc., or if there are discrepancies in the services. If the indicated equipment services are not available, inform the engineer by phone and in writing, also note on the shop drawing. This cooperative effort will correct a problem before the equipment arrives at the job site.

   The shop drawings shall also indicate the scheduled delivery dates the equipment will be at the site.

   If the contractor foresees any problems with equipment size, weight, delivery, etc., it shall be noted in writing, attached to the shop drawings.

1.9 RECORD DOCUMENTS

A. Contractor shall record differences between mechanical work as installed and as shown in Contract Documents on a set of prints of mechanical drawings to be furnished by Architect. Return these prints to Architect at completion of project. Notations made on drawings shall be neat and legible. Comply with Division 1 General Requirements.

1.10 OPERATION AND MAINTENANCE MANUALS

A. Contractor shall prepare and submit Operation and Maintenance Manuals for mechanical systems provided under this Contract. Comply with Division 1 requirements for procedures and requirements for preparation and submittal of manuals.

B. Manual binder shall have permanent lettering of a contrasting color. Information to be included on the binder is as follows:

   1. The front cover shall be lettered as follows:

HVAC
OPERATION AND MAINTENANCE
MANUAL
(PROJECT NAME)
(CITY AND STATE)
(YEAR)

OWNER: (NAME)
ARCHITECT: (NAME)
HVAC ENGINEER: Nielson Engineering Inc.
GENERAL CONTRACTOR: (NAME)
HVAC CONTRACTOR: (NAME)
The spine shall be lettered as follows:

HVAC O & M MANUAL (Year)
(Project Name)

C. Provide a master index at beginning of Manual showing items included. Use plastic tab indexes for sections of Manual.

D. Cover section shall consist of name, address, and phone number of Project Architect, General Contractor, Plumbing and HVAC Engineer, HVAC Contractor, and all HVAC Sub-Contractors.

E. Provide a separate section for each section of the specifications. Provide index for each section listing equipment included. Include all items specified in Section 23. Provide a list of each type of equipment supplied with the local supplier's name, address and phone number.

F. Include descriptive literature (manufacturer's catalog data) of each manufactured item. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined. Data sheets shall be original. Copies are not acceptable.

G. When complete (before constructions begins) one (1) copy of the O & M Manual with approved submittals shall be placed in the Mechanical contractor's construction shack. At the close of the project, submit three (3) copies of manual shall be delivered to the owner at start- up and instruction for Owners use. Follow Division 01 requirements for additional manuals. Information to be included in manual:
   1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
   2. Manufacturer's printed operating procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping shut down, and emergency instructions; and summer and winter operating instructions.
   3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
   4. Servicing instructions and lubrication charts and schedules.
   5. Schematic control diagrams (as built status) for each automatic control system. Mark correct operating setting for each control instrument on these diagrams. A second complete set of control diagrams encased in clear plastic laminate shall be furnished.
   6. Valve schedule indicating the valve symbol (tag number), valve location by room number and description, valve purpose and system served, and valve size. Provide one corresponding set of full-size mechanical prints (as-builts status) showing these valve locations for cross-reference. A second complete set of valve schedules (8-1/2 in. x 11 in.) encased in clear plastic laminate and fitted in an aluminum holding frame shall be furnished to the Owner.
   7. Testing, Adjusting and Balancing Report.
   8. Test records and certifications.
   9. Instruction period checklist.
   10. Warranty information.

1.11 OPERATION AND MAINTENANCE INSTRUCTION AND TRAINING

A. The Contractor shall instruct the Owner's Representative(s) in the Operation and Maintenance procedures described in the Operation and Maintenance Manual. Comply with Division 1 requirements.

B. Individuals present shall include Contractors, Subcontractors, and equipment factory representatives. These individuals shall assist in instruction and start-up.

C. Minimum instruction time shall be eight (8) hours unless otherwise specifically noted.

D. All mechanical systems shall be properly functioning prior to instruction period.

E. Contractor shall prepare a checklist of all equipment and systems requiring instruction and maintenance for verification by the Owner's Representative of satisfactory start-up and instruction. A copy of this checklist shall be included in the Operation and Maintenance Manual.

1.12 GUARANTEE

A. Contractor shall guarantee the satisfactory operation of all material and equipment installed under Division 23 and shall repair or replace to the satisfaction of the Owner or Architect, any defective materials, equipment, or workmanship which may show itself within one year from the date of acceptance.

1.13 CLEANING

A. The Contractor shall, at all times, keep the premises free from accumulations of waste material or rubbish.

B. At completion of the job, the Contractor shall remove all tools, scaffolding, and surplus materials.

PART 2 PRODUCTS

2.1 GENERAL MATERIALS AND EQUIPMENT REQUIREMENTS

A. All materials, in general, shall conform to the requirements of all agencies or publications specified and described in Division 01 of the Contract Specifications.

B. Materials and equipment to be provided shall be the standard catalog products of manufacturers regularly engaged in the manufacture of products conforming to these specifications and shall essentially duplicate materials and equipment that have been in satisfactory use at least two years.

C. All specified materials and equipment shall be American manufactured and made.

2.2 LISTED EQUIPMENT

A. The current Electrical Code requires that all materials, devices, appliances, and equipment, shall be of a type that conforms to applicable standards or be indicated as acceptable by the established standards of the Underwriter's Laboratories, Inc. or other electrical product testing laboratories which are accredited by the department.

B. This statement is being interpreted by the State Electrical Inspector as follows: It is understood that many specialty items such as cast-iron boilers, certain items of air handling equipment and other building components are not available with a UL label covering the entire piece of equipment. The State will impose no requirement that an item of equipment be UL labeled unless it is available as a UL labeled items from at least two manufacturers. Electrical components of unlabeled equipment, such as motors, shall be labeled if they are available from at least two manufacturers.

C. If any building component is available with a UL label from at least two manufacturers, an identical or similar unlabeled component shall not be acceptable for installation in the State of Idaho. Should any such component be installed in the State of Idaho, it shall either be inspected and labeled by a UL representative or other authority approved by the State or it shall be replaced with a UL labeled component, before the building will be accepted by the State Electrical Inspector.

D. Consequently, it shall be the sole responsibility of the Contractor (through project suppliers and equipment manufacturers) to purchase and install only equipment bearing the UL label whenever that equipment so labeled is available. The Contractor, (should any equipment be installed without the proper UL label) shall bear the entire cost of correction to the satisfaction of the Utah State Electrical Inspector.

2.3 SUBSTITUTIONS AND PRODUCT OPTIONS

A. Substitute equipment is encouraged if it is truly an equal to the specified items.

1. The items and/or equipment specified in the contract documents are standard manufacturers items found in suppliers' catalogs, except it be indicated as special. The designer has taken time and effort to analyze, evaluate and prove to himself that the specified units will perform the function needed, wherein it is placed. This means the responsibility for the function of the specified equipment rests with the designer, who knows and understands what is to be accomplished.
2. If a **supplier** and/or the **contractor** desire to substitute equipment in place of a specified item, he may do so, but he takes upon himself or herself the **full responsibility** that the substituted equipment will equal all of the performing characteristics, functions, etc., and/or exceed the performance of the specified item. The substitute equipment shall be of such a physical size and weight that it will mount in the designated location without alterations to the building and the structure will carry the load. If for any reason the substituted equipment requires alterations or modification, in any form to the building and/or the structure, the costs shall be paid by the contractor and/or those requesting the substitutions.
3. Those interested in requesting a substitution shall submit a substitution request. The **Substitution request will be considered if it is at the office of the Engineer eight (8) working days prior to the day of bidding. The request shall include the following:**
   a. A statement certifying that the equipment proposed is equal to that specified; that it has the same mechanical operating characteristics, compatible dimensions, weight, electrical characteristics and meets the function and intent of the equipment named in the contract documents;
   b. The specification and catalog numbers of the substituted equipment;
   c. A pictorial and specification brochure.
4. Because of the short bidding period, (from issuance of drawing to bid date), between the substitution request and the bid date, the designer does not have adequate time to make a full evaluation of substitute equipment. Therefore, **those requesting the substitution** must accept **full responsibility** for the items being submitted for substitution (operating characteristics, physical size, weight, output, not increase the load, etc.). If at any time during the course of construction, **even up into the final completion**, if the designer finds the equipment does not meet the design criteria, comply with the performance, etc., **those requesting the substitution and the contractor have the responsibility to remove the substituted equipment and install the specified item at their expense.** There shall be no cost assessed to the owner and/or the designer and the replacement will not delay the completion of the project.

B. Discrepancies between equipment specified and the intended function of equipment shall be brought to the attention of the Architect/Engineer in writing prior to bidding. Failure to report any conflict, including catalog numbers, discontinued products, etc., does not relieve the Contractor from meeting the intent of the contract documents, nor shall it change the contract cost. If the Contractor is unable to interpret any part of the plans and/or specifications, or should he find discrepancies therein, he shall bring this to the attention of the Architect/Engineer, who will issue interpretation and/or additional instructions to Bidders before the project is bid.

C. Any conflict arising from the use of **substituted equipment shall be the responsibility of the contractor,** who shall bear all costs required to make the equipment comply with the intent of the contract documents.

D. Samples may be required for non-standard or substituted items before installation during construction. Provide all samples as required.

E. No materials or apparatus may be substituted after the bid opening except where the equipment specified has been discontinued. This substitution may be made by a change order.

F. Approved equipment shall be so noted, in writing in a formally issued **Project Addendum**

PART 3 EXECUTION

3.1 COORDINATION

A. Each Contractor shall at all times cooperate with other trades on the job to avoid friction and delay to the progress of work. All points in dispute shall be referred to the Architect.

3.2 SUPERVISION

A. This Contractor shall have in charge of the work at all times a thoroughly competent superintendent. Comply with Division 01 requirements.

3.3 WORKMANSHIP

A. The work under the mechanical contract shall be performed by workers skilled in the particular trade and include all work necessary to properly complete the installation in a professional manner so as to present a neat and finished appearance.

3.4 EXAMINATION OF SITE

A. The Contractor shall visit the site of the proposed work and become familiar with the conditions affecting the work. Contractor shall verify all measurements at the building before beginning work.

3.5 SITE UTILITY SERVICES

A. Where applicable, the Contractor shall make connections to existing permanent source utilities related to his contract immediately so as to provide the use of this service by other trades. Comply with Division 01 requirements.

3.6 EXISTING HVAC SYSTEMS

A. Confirm the locations of existing HVAC Equipment in the area of the facility being remodeled and relate on how it is adapted into the new scheme of things. The Contractor shall assume that connection points are as indicated on the plans. Where connection points are not within this radius, the Contractor shall contact the Architect for a decision before proceeding or may proceed at his own expense.

B. Existing HVAC piping (hot and chilled water), condensate, drain lines, condenser lines (liquid and suction), etc., that are found to obstruct the construction area (walls, floors and ceilings) and obstruct the removal of a wall, doorway or passageway, etc., shall be rerouted and/or relocated to clear the construction. The cost for this work shall be included as part of the project and shall be covered in the contractor's base bid.

C. If supply and/or return air ducts or exhaust ducts fall within or obstruct construction area for whatever reason, the contractor shall relocate these items to allow construction to proceed. The cost for this work shall be included as part of the base bid.

D. Existing extensions: piping (heating, chilled, condenser lines, etc.), ductwork, etc., that are noted to be extended and/or retrofit (for whatever reason) to accommodate added and/or new areas or facilities shall accomplish the intent for which the system was designed. When complete, the system and/or systems shall function as if they were new. This work shall be included in the base bid for the project.

Note: The specifications identify each system herein mentioned and the extension and additions shall adhere to the specifications defined for this phase of construction.

3.7 LAYING OUT WORK

A. Locations of equipment and devices, as shown on the drawings, are approximate unless dimensioned. Exact locations of such items shall be determined by the Architect's representative and/or secured from special details and drawings. Verify the physical dimensions of each item of mechanical equipment to fit the available space and promptly notify the Architect/Engineer prior to roughing-in if conflicts appear. Coordination of equipment to the available space and to the access routes through the construction shall be the Contractor's responsibility.

B. The contractor **shall hand deliver to the general contractor** a written statement and/or a manufacturer's brochure on the equipment being installed at each location. The information shall give the dimensions and weight (loads) of each unit being installed. The general contractor shall forward a copy of this information to the structural engineer and obtain from him confirmation that the building structure will accommodate the loads. If there be any problem the questioning party shall notify the mechanical engineer by phone and in writing.

3.8 CONTRACTOR COORDINATION

A. In the course of installing the systems defined in the contract documents, the contractor shall closely follow the plans, details and specifications (contract documents). The system design has been a careful and laborious undertaking, with the intent purpose of producing a system and/or systems that will serve the owner well with a minimum of maintenance. Thence, the contractor shall adhere as closely as possible to the plans, details, and specifications for each system. Questions and suggestions are encouraged as the project is being assembled. If for any reason, the contractor feels to deviate from the defined information, and finds a way, to improve the system, to make the system more easily assembled, make it operate more efficiently, etc., the contractor shall suggest the change to the engineer. Systems are designed to perform a specific function; the most minute change in assembly may change the function. If the engineer agrees with the change, he will authorize the contractor to proceed. Contractor cooperation and coordination is appreciated. If the contractor proceeds on construction without the designer's authorization, it shall be reworked, in accordance to plans and specifications, which work shall be at the contractor's expense.

3.9 CUTTING AND PATCHING

A. All cutting and patching of new or existing construction required for installation of mechanical systems and equipment specified in Division 23 shall be the responsibility of the Mechanical Contractor unless otherwise noted. Comply with Division 1 for general requirements for cutting and patching.

B. All cutting shall be performed with masonry saws, core drills or similar equipment to provide neat and uniform openings.

C. All patching shall match adjacent surfaces in materials and finish. Do not endanger or damage installed work through procedures and processes of cutting and patching.

D. Arrange for repairs required to restore other work, because of damage caused as a result of HVAC installations.

E. No additional compensation will be authorized for cutting and patching work that is necessitated by ill-timed, defective, or non-conforming installations.

F. Perform cutting, fitting, and patching of HVAC equipment and materials required to:
   1. Uncover work to provide for installation of ill-timed work.
   2. Remove and replace defective work.
   3. Remove and replace work not conforming to requirements of the Contract Documents.
   4. Remove samples of installed work as specified for testing.
   5. Install equipment and materials in existing structures.

G. Upon written instructions from the Architect/Engineer, uncover and restore work to provide for Architect/Engineer observation of concealed work.

H. Cut, remove and legally dispose of selected HVAC equipment, components, and materials as indicated, including, but not limited to removal of HVAC piping, heating units, ductwork plumbing, etc., and other HVAC items made obsolete by the new work.

I. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

J. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

3.10 EXCAVATION AND BACKFILL

A. Contractor shall provide all necessary excavation, shoring, and backfilling required for proper installation of HVAC work inside and outside the building. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to ½ the depth of the excavation, but in no instance closer than 2'. Excavated material not required or not satisfactory for backfill shall be removed from the site and shall be disposed of in designated areas approved for surplus material storage. Grading shall be done as necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed so that the stability of the bottom and sides of the excavation is maintained.

B. Trenches shall be excavated to depth indicated or required to establish indicated slope and invert elevations and to support bottom of piping or conduit on undisturbed soil. Trenches shall be of uniform width, sufficient to provide ample working room and a minimum of 6 to 9" of clearance on both sides of pipe or conduit.

C. The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 3" or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing. Where unyielding material is encountered in the bottom of the trench, such material shall be removed 6" below the required grade and replaced with materials described below for bedding.

D. Excavation for manholes, catch basins, inlets, or similar structures shall be sufficient to leave at least 12" clear between the outer structure surfaces and the face of the excavation or support members. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

E. Bedding material shall be clean, sand-gravel mixture free from organic matter and conforming to the following gradation when tested in accordance with ASTM D 422.

U.S. Standard	Percent Passing Sieve Size
1”	100
No. 4	25-80
No. 200	0-10

F. Bedding material shall be placed to a depth of 6” over the top of piping. The bedding shall be brought up evenly on both sides of the pipe for the full length of the pipe.

G. Backfill for the remainder of the trench shall be satisfactory soil materials complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP.

H. Backfill soil materials shall be free of clay, rock or gravel larger than 2” in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.

I. Backfill to the required grade shall be placed in layers not exceeding 6” loose thickness for compaction by hand operated machine compactors, and 8” loose thickness for other than hand operated machines otherwise specified. Each layer shall be compacted to density as specified in Section 02200.

J. No underground lines shall be covered until the installation has been approved by the inspector having jurisdiction and the Owner's Representative.

K. Provide 4” thick concrete base slab support for piping less than 2' - 6" below surface of roadways. After installation and testing of piping, provide minimum 4” thick encasements (sides and top) of concrete prior to backfilling or placement of roadway subbase.

L. Bracing and shoring shall be provided where depth of excavation or character of ground render it necessary for personnel protection. Shoring shall be constructed of heavy timber planking with timber supports and shall conform to local and state safety laws and regulations.

M. Removal of bracing and shoring materials shall be done before backfilling except where necessary to insure against caving; in which case, it shall be withdrawn while backfilling is being done.

N. Provide barricades around all excavation. Barricades to be securely constructed.

O. The Contractor shall exercise extreme care while excavating in the area of utilities, carefully check for location of all possible utilities, whether shown on the drawings or not, and establish the location of all cutoff valves for ready shut-off of service in case of emergency. The Contractor shall be completely responsible for all damage to any utilities caused in excavating as well as damage to personnel and property caused by said damaged utilities whether shown on the drawings or not.

3.11 REPLACEMENT OF PAVING CONCRETE

A. All existing or new sidewalks, concrete paving, curbs, or asphalt paving removed or damaged by this Contractor during the period of the installation or as a result thereof, shall be replaced with like material in a manner as directed by and to the satisfaction of the Owner's Representative. Comply with Division 02 General Requirements.

3.12 OPENINGS IN DUCTWORK

A. All temporary openings in ducts shall be capped or sealed during construction. Caps shall be removed for final connections.

3.13 PROTECTION OF MATERIALS AND EQUIPMENT

A. Contractor shall be held responsible for any and all materials and equipment to be installed under this contract and will be required to make good at his own cost any injury or damage which materials or equipment may sustain from any source or cause whatsoever before final acceptance. Comply with Division 01 requirements.

3.14 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.

B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.

C. Coordinate deliveries of HVAC materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

3.15 ACCESSIBILITY

A. Install equipment and materials to provide required access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors. Allow ample space for removal of all parts that require replacement or servicing.

B. Access doors or hatches required for servicing of mechanical equipment shall be furnished and installed as specified in the other Divisions and Sections of the Specifications.

3.16 PAINTING

A. Contractor shall touch-up scratched, or damaged factory finishes of HVAC equipment. Comply with Division 01 requirements.

B. Unless otherwise noted, all other painting of HVAC related items shall be according Section 099123 "PAINTING".

3.17 LUBRICATION

A. Contractor shall properly lubricate all pieces of equipment before turning the building over to the Owner. Comply with Division 01 requirements.

3.18 FINAL CLEANING

A. Refer to Division 01 for general requirements for final cleaning.

B. At time of final cleanup, all fixtures and equipment shall be thoroughly cleaned and left in condition for use.

3.19 FIRE PENETRATION SEALS

A. All penetrations through fire rated floors and walls shall be sealed to prevent the spread of smoke, fire, toxic gas, or water through the penetration either before, during or after a fire. The fire rating of the penetration seal shall be at least that of the floor to wall into which it is installed so that the original fire rating of the floor or wall is maintained.

B. The sealant shall remain soft and pliable to allow for the removal and/or addition of piping without the necessity of drilling holes. It shall adhere to itself to allow any and all repairs to be made with the same material. It shall permit the vibration, expansion and/or contraction of piping and ducts going through the penetration without the seal cracking or crumbling.

C. When damming materials are to be left in place after the seal is complete, all such materials shall be non-flammable.

D. When sealant is injected into a penetration, the foam shall expand to surround all items within the penetration and maintain pressure against the walls of the penetration. The foam shall cure within five minutes and be fire resistant at that time. No heat shall be required to further expand the foam to block the passage of fire and smoke or water.

E. All wall or floor penetration openings shall be as small as possible.

F. The foam sealant shall meet the entire fire test and hose stream test requirements of ASTM E119-73 and shall be UL classified as a Wall Opening Protective Device. The sealant shall be CHASE-FOAM, CTC PR-855 Fire Resistant Foam Sealant from Chase Technology Corporation, Huntington Station, New York 11746 or 3M Brand Fire Barrier caulk CP25, putty 303, wrap/strip FS 195 or sheet CS 195 from 3M Products Divisions, 224-4N 3M Center, St. Paul, MN 55144-1000.

END OF SECTION 23 0501

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SECTION 23 0548
VIBRATION AND SEISMIC CONTROL FOR HVAC PIPING, DUCT WORK AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Includes but not limited to:
   1. Quality of and requirements for anchorage and seismic restraint systems and vibration isolation systems for HVAC piping and equipment.

B. Related Sections:
   1. Section 033000: Cast-In-Place Concrete.
   2. Furnishing and installing of seismic restraint and vibration isolation systems is by installer of equipment requiring such systems. Manufacturers of equipment specified for seismic restraint shall provide product data needed for calculation of seismic restraint needs. This information shall include, but not be limited to, equipment dimensions, dimensioned anchor points, operating weight, and center of gravity dimension.

1.2 REFERENCES

A. American Society for Testing and Materials:
   1. ASTM A 615-04b, 'Standard Specification for Deformed & Plain Billet-Steel Bars for Concrete Reinforcement.'

B. Sheet Metal & Air Conditioning Contractors National Association / American National Standards Institute:
   1. SMACNA / ANSI 001-2000, 'Seismic Restraint Manual: Guidelines for Mechanical Systems.'

1.3 SUBMITTALS

A. Product Data:
   1. Restraint system and anchorage method to be used for each piece of equipment.
   2. Seismic restraints and calculations for all flexible mounted equipment.
   3. Vibration isolators and flexible couplings.
   4. Clearly outlined procedures for installing and adjusting isolators, seismic bracing anchors, and snubbers.

B. Shop Drawings:
   1. Show size, hanger length, and location of seismic restraints for piping and ductwork.
   2. Show details for each isolator and seismic brace with snubbers proposed for specified equipment.
   3. Show details for proposed structural steel frames and rails and for anchors to be used in conjunction with isolation of equipment.
   4. Show locations of piping and ductwork restraints on installation and fabrication floor plans (not bid set of documents of floor plans), noting size and type of restraint to be used.
   5. Show details of supports, hangers, anchorage, and bracing for isolated equipment as designed or proposed by professional engineer employed by Restraint Manufacturer and qualified with seismic experience in bracing for mechanical equipment. Shop drawings submitted for seismic bracing and anchors shall bear engineer's signed professional seal.

6. Include anchor bolt calculations, signed and stamped by registered engineer, showing adequacy of bolt sizing and type.
    a. Calculations shall include anchor embedment, minimum edge distance and minimum center distance.
    b. Design lateral forces shall be distributed in proportion to mass distribution of equipment.
    c. Furnish calculations for anchors on restraint devices, cable, isolators, and on rigidly mounted equipment.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: System design and installation shall meet seismic requirements as defined in current edition of International Building Code, Section 1621 and applicable state and local codes in accordance with the site's Seismic Zone and with the minimum restraint capability of .3 g. Explicit requirements and details can be found in referenced SMACNA Manual.

B. Seismic Requirements: Mechanical equipment, piping, and ductwork shall be braced, snubbed, or supported to withstand seismic disturbances and remain operational.

C. Vibration Isolation Requirements: Isolate equipment from structure by means of resilient vibration and noise isolators.

PART 2 - PRODUCTS

PROJECT SPECIFIC: Edit materials list below to include only those materials or elements that are actually part of the Mechanical design.

2.1 MATERIALS

A. Isolation and Seismic Equipment:
    1. Piping: Restrain piping in accordance with Figures 4.11 to 4.19 in SMACNA Manual.
    2. Equipment with Fixed Anchor or Support:
        a. Restraint designed according to the International Building Code.
        b. Horizontal force factor for elements of structures:
            1) In addition, vertical force restraint requirement shall be computed at 1/2 value of horizontal forces.
            2) Restrain equipment not anchored directly to floors by cable system designed and furnished by Restraint Manufacturer.
    3. Ductwork: Restrain ductwork in accordance with Figures 4.2 to 4.10 in SMACNA Manual as appropriate.

B. Vibration Isolation Requirements:
    1. Unless otherwise noted, isolate HVAC equipment one horsepower and over from structure by means of resilient vibration and noise isolators in accordance with ASHRAE HANDBOOK 2003 - HVAC Applications, Table 42, Chapter 47.
    2. Design and install isolation equipment, hangers, connections, and other isolating devices to prevent transmission of vibration to structure from equipment and associated piping and ductwork.
    3. For floor-mounted equipment, use recommendations of Table 45.
    4. For roofs and floors constructed with open web joints, thin long span slabs, wooden construction and unusual light weight construction, evaluate equipment weighing more than 300 pounds to determine additional deflection of structure caused by equipment weight. Isolator deflection shall be 15 times additional deflection or deflection shown in Table 45, whichever is greater.

5. Under-Equipment Spring Isolators:
   a. Equal to Mason SSLFH earthquake motion restrained spring mounts with freestanding stable steel springs, leveling bolts, corrosion resistant finish, motion limiting design, uplift restraining bolts, and ¼" ribbed neoprene noise stop pad.
   b. Isolators shall accept force in any direction up to 1.0 g without failure and shall limit movement to ¾" in any direction.
   c. Springs shall have 50% overload capacity.
   d. Size as required to achieve specified static deflection.
   e. Outer diameter of spring proper shall not be less than 0.8 of spring height when in loaded position.
6. Overhead Support Spring and Rubber Hangers:
   a. Combination spring and neoprene hangers.
   b. Hanger bracket shall have 500% overload capability and shall allow up to 15º hanger rod misalignment without short-circuiting.
   c. Springs shall have 50% overload capacity.
   d. Provide seismic bracing as required.
7. Isolate piping and ductwork in mechanical equipment room and piping and ductwork three supports away or 50' from other mechanical equipment, whichever is greater, from structure by means of vibration and noise isolators.
   a. Isolate suspended piping with combination spring and fiberglass hangers in supporting rods.
   b. Support floor-mounted piping directly on spring mounts.
8. Isolate vertical pipe risers from structure using vibration and noise isolating expansion hangers having minimum rated deflection of four times anticipated pipe movement. Enclose in housing for fail-safe equipment.
9. Incorporate flexible connectors in piping adjacent to reciprocating equipment.
10. Incorporate flexible connections in ductwork adjacent to air-moving units.
11. Elastomeric Isolator: Neoprene or high-quality synthetic rubber with anti-ozone and anti-oxidant additives.
12. Nuts, Bolts, And Washers: Electroplated zinc.
13. Isolators Exposed to Weather: Cadmium plated and neoprene coated springs.

C. Seismic restraint equipment and resilient isolation devices shall be designed and furnished by single Manufacturer.

D. Type One Acceptable Manufacturers:
   1. Amber / Booth Company, Houston, TX www.amberbooth.com
   2. Mason Industries Inc, Hauppauge, NY www.mason-ind.com.
   3. Vibration Mountings and Control Inc, Bloomington, NJ (201) 838-1780.
   4. Equal as approved by Architect before bidding. See Section 01 6000.

2.2 FINISHES

A. Clean and paint steel components. Thoroughly clean structural steel bases of welding slag and prime with zinc-chromate or metal etching primer. Etch and paint hot dipped galvanized steel components.

PART 3 EXECUTION

3.1 INSTALLATION

A. Isolation Equipment:
   1. Mount vibration isolated equipment on rigid steel frames or concrete bases unless Equipment Manufacturer certifies direct attachment capability.
   2. Install snubbers with factory set clearances.

3. Piping:
   a. Protect isolated and non-isolated piping 2½" inside diameter and larger in all planes by restraints to accommodate thermal movement as well as restrain seismic motions.
   b. Locations shall be as scheduled and include, but not be limited to:
      1) At drops to equipment and at flexible connections.
      2) At 45º or greater changes in direction of pipe.
      3) At horizontal runs of pipe 30" maximum on center spacing.
      4) Gas piping shall have additional restraints as scheduled.
4. Ductwork:
   a. Protect isolated and non-isolated rectangular ductwork 4 ft² in cross-sectional area and larger in all planes by restraints to accommodate thermal movement as well as restrain seismic motion.
   b. Locations shall be determined by Seismic Restraint Manufacturer and include, but not be limited to:
      1) Horizontal runs of ductwork 30" maximum on center spacing.
      2) 45º or greater changes in direction of ductwork.
      3) Each end of duct runs and drops of equipment.
      4) Each flexible connection.

B. Vibration Isolation: Install piping and ductwork to prevent transmission of noise and vibration into structure.

END OF SECTION 23 0548

SECTION 230553
MECHANICAL EQUIPMENT AND PIPING IDENTIFICATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

B. Section 230501 Basic Mechanical Materials and Methods sections apply to work of this section.

1.2 SUMMARY

A. Includes but not limited to
   1. Furnish and install identification of equipment and piping as described in Contract Documents.

PART 2 PRODUCTS

2.1 PAINT

A. Benjamin Moore Impervo or equivalent by Paint Manufacturer approved in Architectural Painting Sections.

B. Use appropriate primer.

2.2 LABELS

A. Black Formica with white reveal on engraving.

PART 3 EXECUTION

3.1 APPLICATION

A. Engraved Plates
   1. Identify thermostats and control panels in mechanical rooms, furnaces, boilers and hot water heating specialties, duct furnaces, air handling units, electric duct heaters, and condensing units with following data engraved and fastened to equipment with screws
      a. Equipment mark noted on Drawings (i.e., CU-1)
      b. Area served (i.e., Gym, Administration)

B. Self-Sticking Vinyl Markers
   1. Locate identifying legends and directional arrows at following points on each piping system
      a. Adjacent to each item of equipment and special fitting.
      b. At point of entry and exit where piping goes through wall.
      c. On each riser and junction.
      d. Every 50’ on long continuous lines.
   2. Domestic Hot & Cold Water Piping Identification
      a. Identify domestic hot and cold water piping above and below ceilings with stenciled letters “HW” and “CW” respectively.
      b. Letters shall be 1” high. Provide “Direction of Flow” arrow at each stencil.
      c. Paint color shall be as specified below.

C. Painting: All pipe painting shall be provided for by the installing contractor i.e.: Fire sprinkling by the Fire Sprinkler contractor, plumbing by the Plumbing Contractor.

D. Identification shall comply with, but not limited to the following:

PIPE PAINTING AND LABELING LEGEND

SERVICE & LABEL	SYMBOL	LABEL COLOR * BACKGROUND	LETTER	PIPE COLOR **
CHILLED WATER SUPPLY CHILLED WATER RETURN	CWS CWR	GREEN GREEN	WHITE WHITE	LIGHT BLUE LIGHT BLUE
COOLING TOWER SUPPLY COOLING TOWER RETURN	CTS CTR	GREEN GREEN	WHITE WHITE	LIGHT GREEN LIGHT GREEN
HEAT PUMP SUPPLY HEAT PUMP RETURN	HPS HPR	GREEN GREEN	WHITE WHITE	PASTEL ORANGE PASTEL ORANGE
HEATING WATER SUPPLY HEATING WATER RETURN	HWS HWR	YELLOW YELLOW	BLACK BLACK	DARK ORANGE DARK ORANGE
HP STEAM LP STEAM PUMPED CONDENSATE GRAVITY CONDENSATE	HP ST LP ST PCOND GCOND	YELLOW YELLOW YELLOW` YELLOW	BLACK BLACK BLACK BLACK	DARK PURPLE PURPLE LIGHT PURPLE LIGHT PURPLE

* Ref. ANSI codes 13.1 (1981). See Specs.

** Exposed piping in mechanical rooms, boiler rooms, etc., shall be painted color indicated on chart.

E. SIZE OF LETTERS AND LENGTH OF FIELD

OD OF PIPE OR COVERING	SIZE OF LETTERS	LENGTH OF COLOR FIELD
¾" TO 1-1/2"	½"	8"
1-1/2" TO 2"	3/4"	8"
2-1/2" TO 6"	1-1/4"	12"
8" TO 10"	2-1/2"	24"
OVER 10"	3-1/2"	32"

F. Paint Specification: All surfaces to be painted shall be prepared in accordance with the detailed painting specifications in the Painting Section of these specifications. Surfaces that are not subjected to temperatures higher than 212º F shall be painted as specified for the area in which they are located. Pipes, valves, or other equipment subjected to temperature above 212° F, shall be painted with heat resisting black enamel or heat resisting aluminum paint as specified below. The Owner's Representative shall designate surfaces to be painted aluminum painted at least three coats. Colors shall be selected by Owner's Representative.

G. Heat resisting black enamel shall be Sta-Black as manufactured by Pratt and Lambert Co., or Ebonite Boiler and Stack Paint as manufactured by W.P. Fuller Co. or approved equal suitable for use at temperatures of at least 450°F.

END OF SECTION 23 0553

SECTION 23 0554
MECHANICAL IDENTIFICATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to this section.

1.2 SUMMARY

A. This section includes mechanical identification materials and devices.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specifications Sections.

B. Product data for identification materials and devices.

C. Samples of color, lettering style, and other graphic representation required for each identification material and device.

D. Valve Schedules: Submit valve schedules for each piping system. Reproduce on standard-size bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification. Mark valves intended for emergency shutoff and similar special uses. Furnish extra copies (in addition to mounted copies) for Maintenance Manuals.

1.4 QUALITY ASSURANCE

A. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate installation of identifying devices after completion of covering and painting where devices are applied to surfaces. Install identifying devices prior to installation of acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.1 IDENTIFYING DEVICES AND LABELS

A. General: Products specified are manufacturer's standard products of categories and types required for each application as referenced in other Division 23 Sections. Where more than single type is specified for listed application, selection is Installer's option, but provide since selection for each product category.

B. Stencils: Standard stencils, prepared with letter sizes conforming to recommendations of ASME A13.1. Minimum letter height is 1¼" for ducts and ¾" for access door signs and similar operational instructions.

1. Material: Fiberboard or brass.
2. Stencil Paint: Exterior, oil based alkyd gloss black enamel, except as otherwise indicated. Paint may be in pressurized spray-can form.
3. Identification Paint: Exterior, oil-based alkyd enamel in colors according to ASME A13.1, except as otherwise indicated.

C. Pressure-Sensitive Pipe Markers: Manufacturer's standard pre-printed, color-coded, pressure-sensitive vinyl pipe markers, with permanent adhesive conforming to ASME A13.1.

D. Pipes Smaller Than 6": Full-band pipe markers, extending 360º around pipe at each location.

E. Pipes 6” And Larger: Either full-band or strip-type pipe markers, at least 3 times the letter height and of the length required for the label.

F. Lettering: Manufacturer’s standard pre-printed terms as selected by Architect.

G. Lettering: Use piping system terms as indicated and abbreviate only as necessary for each application length.
   1. Arrows: Either integrally with piping system service lettering (to accommodate both directions), or as separate unit, on each pipe marker to indicate direction of flow.

H. Plastic Tape: Manufacturer’s standard color-coded, pressure sensitive, self-adhesive, vinyl tape, at least 3-mils thick.
   1. Width: 1-1/2” wide on pipes with outside diameters (including insulation) less than 6”; 2½” wide for larger pipes.
   2. Color: Comply with ASME A13.1, except where another color selection is indicated.

I. Valve Tags: Stamped or engraved with ¼” letters for piping system abbreviation and ½” sequenced numbers. Provide a 5/32” hole for fastener.
   1. Material: 19-gauge polished brass
   2. Material: 0.032” thick aluminum
   3. Material: 19-gauge stainless steel
   4. Material: 3/32” thick plastic laminate having 2 black surfaces and a white inner layer.
   5. Material: Valve manufacturer’s standard solid plastic.
   6. Material: Size: 1½” diameter, except as otherwise indicated.
   7. Shape: As indicated for each piping system.

J. Valve Tag Fasteners: Brass chain (wire link or beaded type) or brass S-hooks.

K. Access Panel Markers: 1/16” thick engraved plastic-laminate markers, with abbreviated terms and numbers corresponding to concealed valve. Provide 1/8” center hole for attachment.

L. Valve Schedule Frames: Glazed extruded aluminum display frame, with screws for removable mounting on masonry walls for each page of valve
   1. Glazing: ASTM C 1036, 2.5 mm, single thickness, sheet glass.
      a. Type: Type I, flat transparent.
      b. Class: Class 1, clear.
      c. Quality: Glazing B, for general applications.

M. Engraved Plastic-Laminate Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white (letter color) melamine sub core, except when other colors are indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.
   1. Engraved with engraver's standard letter style, of sizes and with terms to match equipment identification.
   2. Thickness: 1/16”, for units up to 20 in² or 8” length; 1/8” for larger units.
   3. Fasteners: Self-tapping stainless steel screws or contact-type permanent adhesive.

N. Plastic Equipment Markers: Laminated plastic, in the following color code:
   1. Green: Cooling equipment and components.
   2. Yellow: Heating equipment and components.
   3. Yellow/Green: Combination cooling and heating equipment and components.
   4. Brown: Energy reclamation equipment and components.
   5. Blue: Equipment and components that do not meet any of above criteria.
   6. For hazardous equipment, use colors and designs recommended by ASME A13.1.

7. Terminology: Include following, matching schedules as closely as possible:
   a. Name and plan number.
   b. Equipment service.
   c. Design capacity.
   d. Other design parameters such as pressure drop, entering and leaving conditions and rpm.
8. Size: Approximate 2½” by 4” for control devices, dampers and valves; and 4½” by 6” for equipment.

O. Plasticized Tags: Pre-printed or partially pre-printed accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
   1. Size: Approximately 3¼” by 5-5/8”.
   2. Fasteners: Brass grommets and wire.
   3. Nomenclature: Large-size primary wording such as "DANGER," "CAUTION" or "DO NOT OPERATE."

P. Lettering and Graphics: Coordinate names, abbreviations and other designations used in mechanical identification, with corresponding designations indicated. Use numbers, letters, and terms indicated for proper identification, operation, and maintenance of mechanical systems and equipment.
   1. Multiple Systems: Where multiple systems of same name are indicated, identify individual system number as well as service (such as Boiler No. 3, Air Supply No. 1H or Standpipe F12.)

PART 3 EXECUTION

3.1 LABELING AND IDENTIFYING

A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.
   1. Stenciled Markers: Complying with ASME A13.1.
   2. Plastic markers, with application systems. Install on pipe insulation segment where required for hot non-insulated pipes.
      a. Fasten markers on pipes smaller than 6” by one of following methods:
         1) Snap-on application of pre-tensioned semi-rigid plastic pipe marker.
         2) Adhesive lap joint in pipe marker overlap.
         3) Laminated or bonded application of pipe marker to pipe (or insulation).
         4) Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than ¾” wide, lapped 1½” minimum at both ends of pipe marker and covering full circumference of pipe.
      b. Fasten markers on pipes 6” and larger by one of following methods:
         1) Laminated or bonded application of pipe marker to pipe (or insulation).
         2) Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 1-1/2” wide, lapped 3” minimum at both ends of pipe marker and covering full circumference of pipe.
         3) Strapped to pipe (or insulation) with manufacturer's standard stainless steel bands.
   3. Locate pipe markers and color bands as follows wherever piping is exposed in finished spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.
      a. Near each valve and control device.
      b. Near each branch connection, excluding short take-offs for fixtures and terminal units. Mark each pipe at branch, where flow pattern is not obvious.
      c. Near penetrations through walls, floors, ceilings or enter non-accessible enclosures.
      d. At access doors, manholes and similar access points that permit view of concealed piping.

e. Near major equipment items and other points of origination and termination.
f. Spaced at a maximum of 50’ intervals along each run. Reduce intervals to 25’ in congested areas of piping and equipment.
g. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

B. Valve Tags: Install valve tag on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, plumbing fixture supply stops, shut- off valves, faucets, convenience and lawn-watering hose bibbs, and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in valve schedule.
1. Install mounted valve schedule in each major equipment room.

C. Equipment: Install engraved plastic laminate signs or equipment markers on or near each major item of mechanical equipment. Provide signs for following general categories of equipment:
1. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
2. Meters, gages, thermometers and similar units.
3. Fuel-burning units including boilers, furnaces, heaters, stills and absorption units.
4. Pumps, compressors, chillers, condensers and similar motor- driven units.
5. Heat exchangers, coils, evaporators, cooling towers, heat recovery units and similar equipment.
6. Tanks and pressure vessels.
7. Strainers, filters, humidifiers, water treatment systems and similar equipment.

D. Optional Sign Types: Stenciled signs may be provided instead of engraved plastic, at Installer's option, where lettering larger than 1” high is needed for proper identification because of distance from normal location of required identification.
1. Lettering Size: Minimum ¼” for name of unit where viewing distance is less than 2’, ½” for distances up to 6’, and proportionately larger lettering for greater distances. Provide secondary lettering 2/3 to ¾ of size of principal lettering.
2. Terms on Signs: In addition to name of identified unit distinguish between multiple units, indicate operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

E. Plasticized Tags: Install within concealed space to reduce amount of text in exposed sign (outside concealment), where equipment to be identified is concealed above acoustical ceiling or similar concealment.
1. Identify operational valves and similar minor equipment items located in unoccupied spaces (including machine rooms) by installing plasticized tags.

3.2 ADJUSTING AND CLEANING

A. Relocate mechanical identification materials and devices which have become visually blocked by work of this Division or other Divisions.

END OF SECTION 23 0554

SECTION 23 0593
DUCT TESTING, ADJUSTING, AND BALANCING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

B. Section 230501 Basic Mechanical Materials and Methods sections apply to work of this section.

1.2 SUMMARY

A. Includes but not limited to
   1. Test, balance and adjust air duct systems as described in Contract Documents.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements
   1. The air distribution systems shall be balanced by a Balancing or Engineering Firm with five years' experience in HVAC design and balancing. The report shall be stamped by a licensed engineer and certified by NEBB or AABC. The Balancing firm shall furnish the necessary instruments for making tests and performing work. The Mechanical Contractor shall include in his contract all costs including the Balancing Firm's charges.
   2. Noise level shall not exceed PNC 35for all supply and return air outlets and inlets when all mechanical equipment is operating.

1.4 SUBMITTALS

A. Quality Assurance/Control
   1. Four copies of complete test data for evaluation and approval.
   2. Test and Balance Report
      a. Complete with logs, data, and records as required herein. Print logs, data and records on white bond paper bound together in report form.
      b. Certified accurate and complete by Balancing Agency's certified test and balance engineer.
      c. Contain following general data in format selected by Balancing Agency.
         1) Project Number
         2) Project Title
         3) Project Location
         4) Project Architect and Mechanical Engineer
         5) Test and Balance Agency and Certified Engineer
         6) Contractor and mechanical sub-contractor
         7) Dates tests were performed.
         8) Certification Document
         9) Report forms similar to AABC standard format.

      d. Report shall include following:
         1) Preface suggesting abnormalities and problems encountered.
         2) Instrumentation list including type, model, manufacturer, serial number, and calibration dates.
         3) System Identification reporting location of VAV boxes, zones, supply, return and exhaust openings.

4) Record following for each piece of air handling equipment.
   a) Manufacturer, model number and serial number.
   b) Design and manufacturer rated data.
   c) Actual CFM
   d) Suction and discharge static pressure of each fan.
   e) Outside-air and return-air total CFM
   f) Actual operating current, voltage, and brake horsepower of each fan motor.
   g) Final RPM of each motor.
   h) Fan and motor sheave manufacturer, model, size, number of grooves and center distance.
   i) Belt size and quantity.
   j) Static pressure controls final operating set points.

3. Bind approved copy of report in Operations and Maintenance Manual for Division 23

1.5 QUALITY ASSURANCE

A. Qualifications
   1. Work of this Section shall be performed by independent Air Testing and Balance Agency specializing in testing and balancing of heating, ventilating, and cooling systems to balance, adjust and test air moving equipment, air distribution and exhaust systems.
   2. Agency shall provide proof of having successfully completed at least five years of specialized experience in air and hydronic system balancing. Work by his agency shall be done under direct supervision of qualified heating and ventilating engineer employed by Agency.
   3. Agency shall be approved in writing by Architect.
   4. Neither Architect's engineering consultant nor anyone performing work on this Project under other Sections of Division 23 shall be permitted to do this work.

1.6 SCHEDULING

A. Award test and balance subcontract to Agency upon receipt of Notice to Proceed to allow Agency to schedule this work in cooperation with other Sections involved and to comply with completion date.

B. During construction, Agency shall inspect installation of pipe systems, sheet metal work, temperature controls, and other component parts of mechanical systems, perform inspections as follows.
   1. One inspection when 60% of ductwork is installed.
   2. One inspection when 90% of equipment is installed.

C. Do not begin air testing and balancing until
   1. After completion of air cooling, heating, and exhaust systems including installation of specialties, devices, and new filters.
   2. Proper function of control system components including electrical interlocks, damper sequences, air, and water reset, and fire and freeze stats has been verified.
   3. Automatic temperature controls have been calibrated and set for design operating conditions.
   4. Verification of proper thermostat calibration and setting of control components such as static pressure controllers and other devices that may need set points changed during process of balancing system.

PART 2 - PRODUCTS

Not Used

PART 3 EXECUTION

3.1 TEST AND BALANCE COMPANIES

A. Approved Companies
   1. Environmental Engineers
   2. Florite
   3. Building System Technologies
   4. Evolve Building Energy
   5. Danis Test and Balancing
   6. Bonneville Test & Balance LLC
   7. BTC Services
   8. Certified Testing & Balancing, Inc.
   9. Independent Test and Balance
   10. QT&B LLC
   11. Test & Balance, Inc.
   12. RS Analysis Inc.
   13. Diamond Test and Balance
   14. Tempco Services, LLC
   15. Testing company shall submit experience and history 14 days before bid day for approval.

3.2 PREPARATION

A. Heating, ventilating, and cooling systems, and equipment shall be in full operation and continue in operation during each working day of testing and balancing.

3.3 FIELD QUALITY CONTROL

A. Site Tests
   1. If requested, conduct tests in presence of Architect.
   2. Instruments used by Agency shall be accurately calibrated and maintained in good working order.
   3. Air Testing and Balancing Procedure
      a. Perform tests at high and low speeds of multi-speed systems and single speed systems, Perform following testing and balancing functions in accordance with Associated Air Balance Council National Standards.
         1) Fan Speeds
            a) Air Handling Units (with variable pitch pulleys and sheaves) Test and adjust fan RPM to achieve design CFM requirements.
            b) Furnaces and Fan Coil Units (with direct drive motors) Set fan speed to lowest possible setting that will achieve design CFM requirements. Adjust down from Contractor setting, if necessary.
         2) Current and Voltage: Measure and record motor current and voltage
         3) Pitot-Tube Traverse: Perform pitot-tube traverse of main supply and return ducts to obtain total CFM.
         4) Outside Air: test and adjust system minimum outside air by pitot-tube traverse.
         5) Static Pressure: Test and record system static pressures, including suction and discharge static pressure of each fan.
         6) Air Temperature: Take wet and dry bulb air temperatures on entering and leaving side of each cooling coil. Dry bulb temperatures shall be taken on entering and leaving side of each heating unit.
         7) Zone ducts: Adjust zone ducts to within design CFM requirements. At least one zone balancing damper shall be completely open.
         8) Main Ducts: Adjust main ducts to within design CFM requirements and traverse for total CFM quantities.

9) Branch Ducts: Adjust branch ducts to within design Cfm requirements. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.
10) Tolerances: Test and balance each diffuser, grille, and register to within 10% of design requirements.
11) Identification: Identify the location and area of each grille, diffuser, register and terminal box. Record on air outlet data sheets.
12) Description: Record size, type, and manufacturer of each diffuser, grille and register on air outlet data sheets.
13) Terminal Boxes: Set volume regulators on terminal boxes to meet design maximum and minimum CFM requirements. Check temperature controls for proper operation and calibration. Read out diffusers connected to terminal boxes shall be read out in heating and cooling modes and record their readings on air outlet data sheets.
14) Drafts: Adjust diffusers, grilles, and registers to minimize drafts.

b. Permanently mark all outside air, supply air, and return air damper positions after balancing has been completed.

4. Smoke testing, or some other approved means, may be required to determine leak locations if air balance report indicates that any system's CFM total is less than 10% of design CFM. Prior to test, verify that system's duct joints have been sealed as specified and that air moving device in question is supplying required design system air flow. Architect will approve test method required. If smoke test is selected, use following procedure. Provide necessary precautions to protect those performing or observing test from being exposed to smoke.
   a. Use zinc chloride smoke candles, titanium tetrachloride ampules or sticks, or other devices acceptable to Architect to generate smoke.
   b. Close openings in duct except for one opening at farthest end of duct run.
   c. Circulate smoke at pressurized condition of ½" minimum water gauge static pressure.
   d. Report findings to Architect in writing.

B. Final Inspection and Adjustments
1. System shall be balanced, and reports submitted to Architect before final inspection.
2. Balancing Agency shall be represented at final inspection meeting by qualified testing personnel with balancing equipment and two copies of air balancing test report.
   a. Architect will choose and direct spot balancing of one zone. Differences between the spot balance and test report will be justification for requiring repeat of testing and balancing for entire building. If recheck testing demonstrates measured flow deviation of 10% or more from recorded information on report, report will be rejected and new inspection and report will be made and resubmitted.
   b. Perform re-balancing in presence of Architect and subject to its approval.
   c. If re-balancing is required, submit revised air test and balance reports to architect before Substantial Completion.
   d. Spot balance and re-balance shall be performed at no additional cost to Owner.
3. Where furnace supplied to job site provides over 5% more air than schedule requirements, rooms supplied by that furnace shall have their supply air quantities increased by ratio of actual total air quantity supplied to minimum air quantity required by furnace schedule.

END OF SECTION 23 0593

SECTION 23 0800
COMMISSIONING OF HVAC

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division-01 Specification Sections, apply to work of this section.

1.2 SUMMARY

A. Section in includes commissioning process requirements for HVAC & R systems, assemblies, and equipment.

B. Related Sections:
   1. Division 01 Section “General Commissioning Requirements” for general commissioning process requirements.

1.3 DEFINITIONS

A. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

B. CxA: Commissioning Authority.

C. HVAC & R: Heating, Ventilating, Air Conditioning, and Refrigeration.

D. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean “as-built” systems, subsystems, equipment, and components.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates of readiness

B. Certificates of completion and installation, prestart, and start up activities.

1.5 ALLOWANCES

A. Labor, instrumentation, tools, and equipment costs for technicians for the performance of commissioning testing are covered by the “Schedule of Allowances” Article in Division 01 Section “Allowances.”

1.6 UNIT PRICES

A. Commissioning testing allowance may be adjusted up or down by the “List of Unit Prices” Article in Division 01 Section “Unit Prices” when actual man-hours are computed at the end of commissioning testing.

1.7 CONTRACTOR’S RESPONSIBILITIES

A. Perform commissioning tests at the direction of the Engineer.

B. Attend construction phase controls coordination meeting.

C. Attend testing, adjusting, and balancing review and coordination meeting.

D. Participate in HVAC & R systems, assemblies, equipment, and component maintenance orientation and inspection as directed by Engineer.

E. Provide information requested by Engineer for final commissioning documentation.

F. Provide measuring instruments and logging devices to record test data and provide data acquisition equipment to record data for the complete range of testing for the required test period.

1.8 COMMISSIONING OF DOCUMENTATION

A. Provide the following information to Engineer for inclusion in the commissioning plan:
   1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
   2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
   3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC & R systems, assemblies, equipment, and components to be verified and tested.
   4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
   5. Certificate of readiness certifying that HVAC & R systems, subsystems, equipment, and associated controls are ready for testing.
   6. Test and inspection reports and certificates.
   7. Corrective action documents.
   8. Verification of testing, adjusting, and balancing reports.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 TESTING PREPARATION

A. Certify that HVAC & R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify that HVAC & R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by Engineer.

3.2 TESTING AND BALANCING VERIFICATION

A. Prior to performance of testing and balancing work, provide copies of reports, sample forms, checklists, and certificates to Engineer.

B. Notify Engineer at least 10 days in advance of testing and balancing work and provide access for Engineer to witness testing and balancing work.

C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of Engineer.
   1. Engineer will notify testing and balancing contractor 10 days in advance of the date of the field verification. Notice will not include data points to be verified.
   2. The testing and balancing contractor shall use the same instruments (by model and serial number) that were used when original data was collected.
   3. Failure of an item includes, other than sound, a deviation of more than 10%. Failure of more than 10% of selected items shall result in rejection of final testing, adjusting and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.
   4. Remedy the deficiency and notify Engineer so verification of failed portions can be performed.

3.3 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the engineer.

B. Scope of HVAC & R testing shall include entire HVAC & R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. Engineer along with the HVAC & R subcontractor, testing and balancing subcontractor, and HVAC & R instrumentation and control subcontractor, shall prepare detailed testing plans, procedures, and checklists for HVAC & R systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated condition may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by engineer and document simulated conditions and methods of simulation. After test, return settings to normal operating conditions.

G. Engineer may direct that set points be altered when simulating conditions is not practical.

H. Engineer may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the HVAC & R system, document the deficiency and report it to the engineer. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.4 HVAC & R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. Boiler Testing and Acceptance Procedures: Testing requirements are specified in Division 23 boiler sections. Provide submittal, test data, inspector record, and boiler certification to engineer.

B. HVAC & R Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 23 Sections “Instrumentation and Control for HVAC” and “Sequence of Operations for HVAC Controls.” Assist engineer with preparation of testing plans.

C. Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment requirements are specified in Division 23 piping sections. HVAC & R subcontractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final report to engineer. Plan shall include the following:
   1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
   2. Description of equipment for flushing operations.
   3. Minimum flushing water velocity.
   4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

D. Refrigeration System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of chillers, cooling towers, refrigerant compressors and condensers, heat pumps, and other refrigeration systems. Engineer shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

E. HVAC & R Distribution System of Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air, steam, and hydronic distribution systems; special exhaust; and other distribution systems, including HVAC & R terminal equipment and unitary equipment.

F. Vibration and Sound Tests: Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

END OF SECTION 23 0800

SECTION 23 0933
CONTROL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

B. Section 230501 - Basic Mechanical Materials and Methods sections apply to work of this section.

C. Section 230933 - Furnishing and installing of temperature control dampers.

D. Division 26 - Furnishing and installing of raceway (conduit) and junction boxes, including pull wires, for temperature control system except as noted above.

E. Division 26 - Power wiring to magnetic starters, disconnect switches, and motors.

F. Division 26 - Motor starters and disconnect switches, unless integral with packaged equipment.

1.2 SUMMARY

A. Includes but not limited to
   1. Furnish and install automatic temperature control system as described in Contract Documents.
   2. Furnish and install conductors and make connections to control devices and equipment. Furnish and install exposed raceway (conduit) in Mechanical Rooms.
   3. Calibrate, adjust, and set controls for proper operation, operate systems, and be prepared to prove operation of any part of control system. This work is to be completed before pre-final inspection.

1.3 SYSTEM DESCRIPTION

A. Design Criteria
   1. Install line and low voltage electrical wiring, raceway (conduit), and boxes in accordance with Division 26 of these Specifications.
   2. System controls shall be single manufacturer's products.

1.4 SUBMITTALS

A. Shop Drawings
   1. Provide three copies of shop drawing submittal data for review. See Section 230501 for definitions and procedures.

B. Operation & Maintenance Data
   1. Upon completion of work of this Section and prior to final inspection, provide two copies of "as-built" ATC diagrams, schematics, catalog cuts, maintenance instructions, and written operating sequence for each furnace/fan system to be included in Operation
   & Maintenance Manual specified in Section 230501.

PART 2 PRODUCTS

2.1 THERMOSTATS AND DAMPERS

A. Programmable low voltage type provided with automatic change over feature for both heating and ventilating stages, seven-day program with one start and stop per day with three-hour override, and provisions for damper operators.

B. Thermostats to be horizontally mounted.
C. Approved Thermostat Models
   1. Honeywell T7200A1006
   2. All others by prior approval.

D. Approved Economizer Equipment Models
   1. Honeywell W869D, M7415 and C7400.

2.2 CONDUCTORS

A. Color coded and #16 AWG Type TFN or THHN.

PART 3 EXECUTION

3.1 INSTALLATION

A. Run all wiring in conduit.

B. Safety Controls
   1. Fresh air dampers shall close on fan shut-down, power failure, open fan motor disconnect switch, and when thermostat is in UNOCCUPIED mode.

C. Mount Room Thermostats 4'-0" from floor to center of thermostat.

D. Mount damper actuators and actuator linkages external of air flow.

E. Provide fresh battery in each thermostat (Mallory MN1604 9-volt alkaline type or equal) and instruct custodian in battery replacement.

3.2 FIELD QUALITY CONTROL

A. Field Service
   1. Calibrate, adjust, and set controls for proper operation, operate systems, and be prepared to prove operation of any part of control system. This work is to be completed before prefinal inspection.

3.3 ADJUSTING, CLEANING

A. Remove unused wire and conduit from site and test system's controls for two days.

END OF SECTION 23 0933

SECTION 23 2300
REFRIGERANT PIPING SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

B. Section 230501 - Basic Mechanical Materials and Methods sections apply to work of this section.

C. Section 232315 - Refrigerant piping Insulation

1.2 SUMMARY

A. Includes but not limited to
   1. Furnish and install piping for refrigeration systems as described in Contract Documents.
   2. All materials and equipment specified under this section shall be American manufactured and made.

1.3 QUALITY ASSURANCE

A. Qualifications
   1. Refrigerant piping shall be installed by a refrigeration contractor licensed by State.
   2. All materials and equipment specified under this section shall be American manufactured and made.

PART 2 PRODUCTS

2.1 REFRIGERANT PIPING

A. Meet requirements of ASTM B 280-88, "Specification for Seamless Copper Tube for Air Conditioning & Refrigeration Field Service", hard drawn straight lengths.

B. Do not use pre-charged refrigerant lines.

C. All materials and equipment specified under this section shall be American manufactured and made.

2.2 REFRIGERANT FITTINGS

A. Wrought copper with long radius elbows.

B. Approved Manufacturers
   1. Mueller Streamline
   2. Nibco Inc
   3. Grinnell
   4. Elkhart Products Corp

2.3 SUCTION LINE TRAPS

A. Manufactured standard one-piece traps.

2.4 CONNECTION MATERIAL

A. Brazing Rods
   1. Copper to Copper Connections
      a. AWS Classification BCuP-4 Copper Phosphorus (6% silver).
      b. AWS Classification BCuP-5 Copper Phosphorus (15% silver).
   2. Copper to Brass or Copper to Steel Connections
      a. AWS Classification bAg-5 Silver (45% silver).
   3. Do not use rods containing Cadmium.

2.5 FLUX

A. Approved Manufacturers
   1. "Stay-Silv white brazing flux" by J W Harris Co
   2. High quality silver solder flux by Handy & Harmon

PART 3 EXECUTION

3.1 INSTALLATION

A. Do not install refrigerant piping underground or in tunnels.

B. Slope suction lines down toward compressor 1”/10’. Locate traps at vertical rises against flow in suction lines.

C. Refrigeration system connections shall be copper-to-copper, copper-to-brass, or copper-to-steel type properly cleaned and brazed with specified rods. Use flux only where necessary.
   1. No soft solder (tin, lead, antimony) connections will be allowed in system.

D. Braze valve, sight glass, and flexible connections.

E. Circulate dry nitrogen through tubes being brazed to eliminate formation of copper oxide during brazing operation.

3.2 FIELD QUALITY CONTROL

A. Make evacuation and leak tests in presence of Architect's Engineer after completing refrigeration piping systems. Positive pressure test will not suffice for procedure outlined below.
   1. Draw vacuum on each entire system with vacuum pump to 300 microns using vacuum gauge calibrated in microns. Do not use cooling compressor to evacuate system nor operate it while system is under high vacuum. Isolate compressor from system piping using shut-off valves prior to pulling vacuum.
   2. Break vacuum with Freon to be used and re-establish vacuum test. Vacuum shall hold for 30 minutes at 300 microns without compressor running.
   3. Conduct tests at 70° F ambient temperature minimum.
   4. Do not run systems until above tests have been made and systems started up as specified. Inform Owner's Representative of status of systems at time of final inspection and schedule start-up and testing if prevented by outdoor conditions before this time.
   5. After testing, fully charge system with refrigerant and conduct test with Halide Leak Detector.

END OF SECTION 23 2300

SECTION 23 2315
REFRIGERANT PIPING INSULATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

B. Section 230501 Basic Mechanical Materials and Methods sections apply to work of this section.

1.2 SUMMARY

A. Includes but not limited to
   1. Furnish and install insulation on above ground refrigerant suction piping and fittings, including thermal bulb, from thermal expansion valve as described in Contract Documents.

PART 2 PRODUCTS

2.1 FLEXIBLE FOAMED PIPE INSULATION

A. Thickness
   1. 1½” for all pipe diameter.

B. Approved Manufacturers
   1. Armaflex
   2. Rubatex
   3. CSG "Ultrafoam"
   4. IMCOA "ImcoLock"

2.2 JOINT SEALER

A. Approved Manufacturers
   1. Armaflex 520
   2. BFG Construction Adhesive #105
   3. Therma-Cel 950.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install insulation in snug contact with pipe and in accordance with Manufacturer's recommendations.

B. Stagger joints on layered insulation.

C. Slip insulation on tubing before tubing sections and fittings are assembled keeping slitting of insulation to a minimum.

D. Seal joints in insulation. Use black nylon 1" tie straps every 2’.

E. Insulate flexible pipe connectors.

F. Insulate thermal expansion valves with insulating tape.

G. Insulation exposed outside building shall have "slit" joint seams placed on bottom of pipe.

H. Insulate fittings with sheet insulation and as recommended by Manufacturer.

I. Paint exterior exposed insulation with two coats of white or gray finish recommended by Insulation Manufacturer, except on Therma-Cel insulation.

END OF SECTION 23 2315

SECTION 23 3115
DUCTWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

B. Section 230501 Basic Mechanical Materials and Methods sections apply to work of this section.

1.2. SUMMARY

A. Extent of metal ductwork is indicated on drawings and in schedules, and by requirements of this section.

B. Types of ductwork required for the project include the following:
   1. Round
   2. Rectangular
   3. Spiral
   4. Factory

C. Exterior Insulation of metal ductwork is specified in other Division-23 sections and is included as work of this section.

D. Refer to other Division-23 sections for exterior insulation of metal ductwork; not work of this section.

E. Refer to other Division-23 sections for ductwork accessories; not work of this section.

F. Refer to other Division-23 sections for fans and air handling units; not work of this section.

G. Refer to other Division-23 sections for mechanical controls; not work of this section.

H. Refer to other Division-23 sections for grilles and diffusers; not work of this section.

I. Refer to other Division-23 sections for system commissioning, testing, and balancing, work not of this section.

1.3. QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of metal ductwork products of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: A firm with at least 3 years of successful installation experience on projects with metal ductwork systems similar to that required for project.

C. The installer shall have a publicly registered bonding capacity of sufficient amount to cover this work and all other work in progress by the Contractor.

D. All workmen on the project shall carry state licenses as journeymen or apprentice sheet metal workers with additional certification for welders.

1.4. SUBMITTALS

A. Product Data: Submit manufacturer's technical product data and installation instructions for metal ductwork materials and products.

B. Shop Drawings: Submit scaled layout drawings of metal ductwork and fittings including, but not limited to, duct sizes, locations, elevations, and slopes of horizontal runs, wall and floor penetrations and connections. Show interface and special relationship between ductwork and proximate equipment. Show modifications of indicated requirements, made to conform to local shop practice, and how those modifications ensure that free area, materials, and rigidity are not reduced.

C. Record Drawings: At project closeout, submit record drawings of installed metal ductwork and ductwork products, in accordance with requirements of Division 01.

D. Maintenance Data: Submit maintenance data and parts lists for metal ductwork materials and products. Include this data, product data, shop drawings, and record drawings in maintenance manual; in accordance with requirements of Division 01.

1.5. REFERENCES

A. Codes and Standards
   1. SMACNA Standards: Comply with SMACNA "HVAC Duct Construction Standards, Metal and Flexible" for fabrication and installation of metal ductwork.
   2. ASHRAE Standards: Comply with ASHRAE Handbook, Equipment Volume, Chapter 1 "Duct Construction", for fabrication and installation of metal ductwork.
   3. NFPA Compliance: Comply with NFPA 90A "Standard for the Installation of Air-Conditioning and Ventilating Systems" and NFPA 90B "Standard for the Installation of Warm Air Heating and Air-Conditioning Systems".
   4. Uniform Building Code/Uniform Mechanical Code: Comply with all sections pertaining to mechanical work.

B. Field Reference Manual: Have available for reference at project field office, copy of SMACNA "HVAC Duct Construction Standards, Metal and Flexible".

1.6 DELIVERY, STORAGE AND HANDLING

A. Protection: Protect shop-fabricated and factory-fabricated ductwork, accessories and purchased products from damage during shipping, storage, and handling. Prevent end damage and prevent dirt and moisture from entering ducts and fittings.

B. Storage: Where possible, store ductwork inside and protect from weather. Where necessary to store outside, store above grade and enclosed with waterproof wrapping.

PART 2 PRODUCTS

2.1 DUCTS

A. Standards: All duct fabrications shall comply with standards and techniques detailed by SMACNA “Duct Construction Manuals” for the appropriate pressure class, and with the ASHRAE Handbook, current edition, Chapter 1, Duct Construction.

B. Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lockforming quality, with G 90 zinc coating in accordance with ASTMA A 525; mill phosphatized for exposed locations.
   1. All materials and equipment specified under this section shall be American manufactured and made.

C. Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide paint lock duct materials which are free from visual imperfections including pitting, seam marks, roller marks, stains and discolorations, and other imperfections, including those which would impair painting. Installation of exposed ductwork shall be laid out in advance and submitted for review. Ductwork shall be hung straight and uniform, points shall be true, seams shall show continuity.

D. Kitchen hood exhaust ductwork shall be fabricated in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible and NFPA 96.
   1. Construct of 16-gauge, carbon steel or 18 gage stainless steel, using continuous external welded joints.

2.2 FITTINGS AND FABRICATION

A. Fittings: Provide radius type fittings fabricated of multiple sections with maximum 15° change of direction per section. Unless specifically detailed otherwise, use 45° lateral and 45° elbows for branch take-off connections. Where 90° branches are indicated, provide conical type tees.

B. Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius equal to associated duct width, and fabricate to include turning vanes in elbows where shorter radius is necessary. Limit angular tapers to 30° for contracting tapers and 20° for expanding tapers.

C. Fabricate ductwork with accessories installed during fabrication to the greatest extent possible. Refer to Division-23 section "Duct Accessories" for accessory requirements.

D. Fabricate ductwork with duct liner in each section of duct where indicated. Laminate liner to internal surfaces of duct in accordance with instructions by manufacturers of lining and adhesive and fasten with mechanical fasteners.

E. Offset, transition, adapt ductwork to structural obstacles and work of other trades in a coordinated effort. Layout work to avoid conflict with piping, etc. With review of conditions, teardrop around conflicting piping, lights, etc., all at no added cost to the owner.

2.3 LOW PRESSURE ROUND DUCTWORK (1" SMACNA Pressure Class)

A. Round type ductwork for use on low velocity supply systems (1200 fpm maximum), low pressure (0.75" maximum duct pressure), shall be fabricated on 26-gauge galvanized steel sheets with snap-lock longitudinal seams and crimped and beaded joins.

B. All end joints shall have at least three screw fasteners and shall be wrapped airtight. Transverse and longitudinal seams shall be taped with "Hardcast TA". Elbows and fittings shall provide smooth air flow patterns and have a neat appearance.

C. Use factory fabricated elbows of the multi-sectional adjustable type.

2.4 LOW PRESSURE RECTANGULAR DUCTWORK (3" SMACNA Pressure Class)

A. Rectangular ductwork for use on supply systems up to 2" maximum duct static pressure and 2000 fpm maximum duct velocity shall be constructed of galvanized steel using construction for nominal 3" SMACNA rated systems. Seal all transverse joints with duct cement or tape with "Hardcast TA".

B. Use radius elbows or turning vanes with extended trailing edge. Use 45° tapping takeoffs with downstream balance damper.

C. Duct dimensions are inside clear. Increase for acoustical lining.

D. For rectangular exhaust ducts, increase metal gauge by 2 (i.e., 20 to 18) for all sizes. Seal all joints.

2.5 MISCELLANEOUS DUCTWORK MATERIALS

A. General: Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.

B. Spin-in Fittings: Spin-in fittings shall be used to make round to rectangular duct connections. Use bell mouth fittings. Provide with locking quadrant dampers where balance is involved. Provide with insulation guard where insulated duct is involved.

C. Duct Sealing Compound: Duct sealing compound shall be 3M brand number EC-750 or Duro-Dyne S-2. This material shall be used in making up duct joints or in water proofing, caulking plenums, etc.

D. Acoustical Lining: Acoustical lining in ducts shall be 1' thick., 1½ pound density, coated, flexible glass fiber type, set in adhesive and impaled on weld studs spaced not more than 12" on centers and secured with lock washers. Airstream surface faced with black coated matte. Acoustical lining shall completely line the ducts. Lining shall have a fire and smoke hazard rating not exceeding 20-50-50. Owens-Corning, Johns-Manville, Certainteed.
   1. All joints, edges and/or surface breaks in the coating of the acoustical lining shall be pointed up to a smooth surface with adhesive.

E. Duct Liner Adhesive: Comply with ASTM C 916 "Specifications for Adhesives and Duct Thermal Insulation".

F. Duct Liner Fasteners: Comply with SMACNA HVAC Duct Construction Standards, Article S2.11.

G. Duct Cement: Non-hardening migrating mastic or liquid neoprene-based cement (type applicable for fabrication/installation detail) as compounded and recommended by manufacturer specifically for cementing fitting components, or longitudinal seams in ductwork.

H. Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim and angles for support of ductwork.

2.6 CONCEALED CEILING DAMPER REGULATORS

A. Approved Manufacturers
   1. Cain
   2. Duro Dyne
   3. Metco Inc
   4. Vent-Lock - #666
   5. Young - #303

2.7 VOLUME DAMPERS

A. In Main Ducts
   1. 16-gauge galvanized steel opposed blade type with 3/8” pins and end bearings. Blades shall have 1/8” clearance all around.
   2. Damper shall operate within acoustical duct liner.
   3. Provide channel spacer equal to thickness of duct liner.
   4. Approved Manufacturers
      a. Air Balance
      b. Air Control Products
      c. American Warming
      d. Greenheck
      e. Vent Products

B. In Sheet Metal Branch Ducts
   1. Extruded aluminum opposed blade type. When in open position, shall not extend beyond damper frame.
   2. Maximum blade length 12”.
   3. Damper Regulator shall be concealed type with operation from bottom or with 90º miter gear assembly from side.
   4. Approved Manufacturers
      a. Air Control Products
      b. Air Guide
      c. Arrow
      d. Reliable Metals
      e. Tuttle & Bailey
      f. Young

C. Dampers above removable ceiling and in Mechanical Rooms shall have locking quadrant on bottom or side of duct. Otherwise, provide concealed ceiling damper regulator and cover plate.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Examine areas and conditions under which metal ductwork is to be installed. Do not proceed with work until satisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 INSTALLATION OF METAL DUCTWORK

A. General: Assemble and install ductwork in accordance with recognized industry practices which will achieve airtight (5% leakage for systems rated 3" and under; 1% for systems rated over 3") and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers, and anchors of type which will hold duct true-to-shape and to prevent buckling. Support vertical ducts at every floor.

B. All necessary allowance and provisions shall be made in the installation of sheet metal ducts for the structural conditions of the building, and ducts shall be transformed or divided as may be required. Whenever this is necessary, the required area shall be maintained. All of these changes must be approved and installed as directed at project. During the installation, the open ends of ducts shall be protected to prevent debris and dirt from entering.

C. Field Fabrication: Complete fabrication of work at project as necessary to match shop-fabricated work and accommodate installation requirements.

D. Routing: Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details, and notations or, if not otherwise indicated, run ductwork in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent-enclosure elements of building. Limit clearance to ½" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. Wherever possible in finished or occupied spaces, conceal ductwork from view, by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.

E. Electrical Equipment Spaces: Do not run ductwork through transformer vaults and other electrical equipment spaces and enclosures.

F. Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gage as duct. Overlap opening on 4 sides by at least 1½". Fasten to duct and substrate.
   1. Where ducts pass through fire-rated floors, walls, or partitions, provide firestopping between duct and substrate, in accordance with requirements of Division-27 Section "Firestopping".

G. Ducts at Masonry: Where ducts are shown connecting to or passing through gypsum board, masonry openings and along edges of all plenums at floors and walls, provide a continuous 2" x 2-1/8" galvanized angle iron which shall be bolted to the construction and made airtight to the same by applying caulking compound. Sheet metal in these locations shall be bolted to the angle iron. Round high velocity ducts in vertical chases shall be supported with rolled angle rings.

H. Cross Breaking: Rectangular sheet metal ducts shall be cross broken on the four sides of each 4' panel. All vertical and horizontal sheet metal barriers, duct offsets, elbows, as well as 4' panels of straight sections of ducts shall be cross broken. Cross breaking shall be applied to the sheet metal between the standing seams or reinforcing angles; the center of cross break shall be of the required height to assure surfaces being rigid.

I. Coordination: Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls, and other associated work of ductwork system.

J. Installation: Install metal ductwork in accordance with SMACNA HVAC Duct Construction Standards.

K. Install concealed ceiling damper regulators.
   1. Paint cover plates to match ceiling tile.
   2. Damper regulators will not be required for dampers located directly above removable ceilings or in Mechanical Rooms.

L. Provide each take-off with an adjustable volume damper to balance that branch.
   1. Anchor dampers securely to duct.
   2. Install dampers in main ducts within insulation.
   3. Dampers in branch ducts shall fit against sheet metal walls, bottom and top of duct, and be securely fastened. Cut duct liner to allow damper to fit against sheet metal.
   4. Where concealed ceiling damper regulators are installed, provide a cover plate.

3.4 INSTALLATION OF FLEXIBLE DUCTS

A. Maximum Length: For any duct run using flexible ductwork, do not exceed 3'-0" extended length.

B. Installation: Install in accordance with Section III of SMACNA's "HVAC Duct Construction Standards, Metal and Flexible".

3.5 HANGERS AND SUPPORTS

A. It is essential that all ducts shall be rigidly supported. Hangers for low velocity ducts up to 18" in width shall be placed on not more than 10' centers.

B. Low velocity ducts 19" through 35" in width and greater shall be supported on not more than 5' centers. Where vertical ducts pass through floors or roofs, heavy supporting angles shall be attached to ducts, and to structure. Angles shall be of sufficient size to support the ductwork rigidly and shall be placed on at least two sides of the duct.

C. Construct hangers for rectangular ductwork from galvanized iron 1" x 1/16". Hangers shall extend down the sides of rectangular ducts the full dept of the duct and shall be bent underneath the duct 2". Hangers shall be secured to the duct using sheet metal screws or rivets of appropriate sizes on 6" centers, but not less than two screws in the side and one in the bottom of each hanger.

D. For rectangular ducts 36" and greater in width construct hangers from galvanized iron 1½" x 1/16". Hangers shall be installed and secured to duct as described in Paragraph B.

3.6 SUPPORTING DAMPERS

A. Parallel and opposed blade motor operated dampers shall be supported by reinforcing the ductwork or sheet metal walls at the damper locations to carry the weight of the dampers and the force exerted on the dampers due to air pressure or shall be supported independent of ductwork from the ceiling of floor, as conditions at the site determine.

3.7 CONNECTIONS

A. Connections of high velocity supply and exhaust ducts, fittings, and high velocity mixing boxes shall be made airtight by coating joints with Minnesota Mining Co. Mastic, Type EC-800, Benjamin Foster, Sheet Metal Products Co., or approved equal, before joining, and then sealing the joint with one layer of "Glass-Fab" reinforcing tape set in a coating of the above compound. Tape and sealant shall not exceed a flame spread of 25 or a smoke development of 50.

3.8 FIELD QUALITY CONTROL

A. Leakage Tests: After each duct system which is constructed for duct classes over 3" is completed, test for duct leakage in accordance with SMACNA HVAC Air Duct Leakage Test Manual. Air leaks which are in excess of that required to bubble the soap suds (that is, actually blow the suds away) shall be sealed by additional taping and caulking to reduce the leakage to a rate not to exceed slow bubbles forming. Repair leaks and repeat tests until total leakage is less than 1% of system design air flow.

3.9 EQUIPMENT CONNECTION

A. General: Connect metal ductwork to equipment as indicated; provide flexible connection for each ductwork connection to equipment mounted on vibration isolators, and/or equipment containing rotating machinery. Provide access doors as indicated.

3.10 ADJUSTING AND CLEANING

A. Clean ductwork internally of dust and debris, as follows: Before the ceilings are installed, with filters in place, operate the fans at full capacity to blow out dirt and debris from ducts. If it is not practical to use the main supply blower for this test, the ducts may be blown out in sections by a portable fan.

B. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal, or where ductwork is to be painted, might interfere with painting or cause paint deterioration.

C. Balancing:
   1. Refer to Division-23 section "Testing, Adjusting and Balancing" for air distribution balancing of metal ductwork; not work of this section. However, the Sheet Metal Contractor shall participate fully in this work. Seal any leaks in ductwork that become apparent in balancing process.
   2. If specified conditions cannot be obtained due to deficiencies in equipment performance or improper installation or workmanship, the Mechanical Contractor and his subcontractors shall make any changes necessary to obtain the specified conditions.

END OF SECTION 23 3115

SECTION 23 3300
AIR DUCT ACCESSORIES

PART 1 GENERAL
1.1 SUMMARY
A. Includes but not limited to:
1. Furnish and install duct accessories in specified ductwork as described in Contract Documents.

B. Related Sections:
1. Section 230933: Temperature control damper actuators and actuator linkages.
2. Section 233001: Common Duct Requirements.

1.2 REFERENCES
A. American Society for Testing and Materials:
1. ASTM A 653-02a, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.'
2. ASTM C 665-01, 'Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.'
3. ASTM C 1071-00, 'Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Acoustical Material).'

PART 2 PRODUCTS
2.1 COMPONENTS
1. Adhesive:
   a. Category Four Approved Water-Based Products. See Section 016000 for definitions of Categories.
      1) Kingco: 10-568.
      2) Miracle: PF-101.
      3) Mon-Eco: 22-67 or 22-76.
      4) Polymer Adhesive: Glasstack #35.
      5) Techno Adhesive: 133.
      6) United McGill: Uni-tack.
   b. Category Four Approved Solvent-Based (non-flammable) Products. See Section 016000 for definitions of Categories.
      1) Cain: Safetak.
      2) Duro Dyne: FPG.
      3) Hardcast: Glas-Grip 648-NFSE.
      4) Kingco: 15-137.
      5) Miracle: PF91.
      6) Mon-Eco: 22-24.
      7) Polymer Adhesive: Q-Tack.
      8) Techno Adhesive: 'Non-Flam' 106.
   c. Category Four Approved Solvent-Based (flammable) Products. See Section 016000 for definitions of Categories.
      1) Cain: HV200.
      2) Duro Dyne: MPG.
      3) Hardcast: Glas-Grip 636-SE.
      4) Kingco: 15-146.
      5) Miracle: PF-96.
      6) Mon-Eco: 22-22.
      7) Polymer Adhesive: R-Tack.
      8) Techno Adhesive: 'Flammable' 106.

2. Fasteners:
   a. Adhesively secured fasteners not allowed.
   b. Category Four Approved Products. See Section 016000 for definitions of Categories.
      1) AGM Industries Inc: 'DynaPoint' Series RP-9 pin.
      2) Cain.
      3) Duro Dyne.
      4) Dyn Air: DWT or FWT
      5) Omark dished head 'Insul-Pins.'
      6) Gripnails may be used if each nail is installed by 'Grip Nail Air Hammer' or by 'Automatic Fastener Equipment' in accordance with Manufacturer's recommendations.

A. Flexible Equipment Connections:
   1. 30 oz closely woven UL approved glass fabric double coated with neoprene.
   2. Fire retardant, waterproof, air-tight, resistant to acids and grease, and withstand constant temperatures of 250º F 121º C.
   3. Category Four Approved Products. See Section 016000 for definitions of Categories.
      a. Cain: N-100.
      b. Duro Dyne: MFN.
      c. Dyn Air: CPN with G-90 galvanized off-set seam
      d. Elgen: ZLN.
      e. Ventfabrics: Ventglas.
      f. Ductmate: ProFlex.

B. Dampers and Damper Accessories:
   1. Volume Dampers:
      a. Factory-manufactured 16 ga galvanized steel, single blade and opposed blade type with 3/8” axles and end bearings. Blade width 8” maximum. Blades shall have 1/8” clearance all around.
         1) Damper shall operate within acoustical duct liner.
         2) Provide channel spacer equal to thickness of duct liner.
      b. Dampers above removable ceiling and in Mechanical Rooms shall have locking quadrant on bottom or side of duct. Otherwise, furnish with concealed ceiling damper regulator and cover plate.
      c. Category Four Approved Products. See Section 016000 for definitions of Categories.
         1) Air-Rite: Model CD-2.
         2) American Warming: VC-2-AA.
         3) Arrow: OBDAF-207.
         4) C & S: AC40.
         5) Cesco: AGO.
         6) Daniel: CD-OB.
         7) Greenheck: VCD-20.
         8) Pottorff: CD-42.
         9) Ruskin: MD-35.
         10) UTEMP: CD-OB.

C. Air Turns:
   1. Single thickness vanes. Double thickness vanes not acceptable.
   2. 4-1/2” wide vane rail. Junior vane rail not acceptable.

D. Branch Tap for Flexible Ductwork:
   1. Factory-manufactured rectangular-to-round 45º leading tap fabricated of 24 ga zinc-coated lock-forming quality steel sheets meeting requirements of ASTM A 653, with G-90 coating.
   2. 1" wide mounting flange with die formed corner clips, pre-punched mounting holes, and adhesive coated gasket.
   3. Manual Volume Damper:
      a. Single blade, 22 ga
      b. 3/8" minimum square rod with brass damper bearings at each end.
      c. Heavy-duty locking quadrant on 1½" high stand-off mounting bracket attached to side of round duct.
   4. Category Four Approved Products. See Section 01 6000 for definitions of Categories.
      a. ST-1HD by Air-Rite.
      b. STO by Flexmaster.
      c. HET by Sheet Metal Connectors.

2.2 MANUFACTURERS

A. Contact Information:
   1. AGM Industries, Brockton, MA www.agmind.com.
   2. Air Balance Inc, Holland, OH www.air-balance.com.
   3. Air Filters Inc, Baltimore, MD www.afinc.com.
   4. Air-Rite Manufacturing, Bountiful, UT www.air-ritemfg.com.
   5. American Warming & Ventilating, Holland, OH www.american-warming.com.
   6. Arrow United Industries, Wyalusing, PA www.arrowunited.com.
   7. Cain Manufacturing Company Inc, Pelham, AL www.cainmfg.com.
   8. C&S Air Products, Montebello, CA www.csairproducts.com.
   9. CertainTeed Corp, Valley Forge, PA www.certainteed.com.
   10. Cesco Products, Minneapolis, MN www.cescoproducts.com.
   11. Daniel Manufacturing, Ogden, UT (801) 622-5924.
   12. Design Polymerics, Fountain Valley, CA www.designpoly.com.
   13. Ductmate Industries Inc, East Monongahela, PA www.ductmate.com.
   14. Duro Dyne, Farmingdale, NY www.durodyne.com.
   15. Dwyer Instruments Inc, Michigan City, IN www.dwyer-inst.com.
   16. Flexmaster USA Inc, Houston, TX www.flexmasterusa.com.
   17. Greenheck Corp, Schofield, WI www.greenheck.com.
   18. Gripnail Corp, East Providence, RI www.gripnail.com.
   19. Hardcast Inc, Wylie, TX www.hardcast.com.
   20. Honeywell Inc, Minneapolis, MN www.honeywell.com.
   21. Industrial Acoustics Co, Bronx, NY www.industrialacoustics.com.
   22. Johns-Manville, Denver, CO www.jm.com.
   23. Kees Inc, Elkhart Lake, WI www.kees.com.
   24. Kingco - King Adhesive Corp, St Louis, MO (800) 233-8171 or (314) 772-9953.
   25. Knauf Fiber Glass, Shelbyville, IN www.knauffiberglass.com.
   26. Manson Insulation Inc, Brossard, QB www.isolationmanson.com.
   27. Metco Inc, Salt Lake City, UT (801) 467-1572.
   28. Miracle.
   29. Mon-Eco Industries Inc, East Brunswick, NJ (800) 899-6326 or (908) 257-7942.
   30. Nailor Industries Inc, Houston, www.nailor.com.
   31. Omark.
   32. Owens Corning, Toledo, OH www.owenscorning.com.
   33. Polymer Adhesive Sealant Systems Inc, Irving, TX www.polymeradhesives.com.
   34. Pottorff Company, Montebello, CA www.pottorff.com.
   35. Ruskin Manufacturing, Kansas City, MO www.ruskin.com.
   36. Sheet Metal Connectors Inc, Minneapolis, MN www.smconnectors.com.
   37. Techno Adhesive.
   38. Titus, Richardson, TX (972) 699-1030. www.titus-hvac.com

39. United McGill Corp, Columbus, OH www.unitedmcgill.com.
40. Utemp Inc, Salt Lake City, UT (801) 978-9265.
41. Ventfabrics Inc, Chicago, IL www.ventfabrics.com.
42. Young Regulator Co, Cleveland, OH www.youngregulator.com.

2.3 FABRICATION

A. Duct Liner:
1. Install mat finish surface on airstream side. Secure insulation to cleaned sheet metal duct with continuous 100% coat of adhesive and with ¾" long mechanical fasteners 1' on center maximum unless detailed otherwise on Drawings. Pin all duct liner.
2. Accurately cut liner and thoroughly coat ends with adhesive. Butt joints tightly. Top and bottom sections of insulation shall overlap sides. If liner is all one-piece, folded corners shall be tight against metal. Ends shall butt tightly together.
3. Coat longitudinal and transverse edges of liner with adhesive.

B. Air Turns:
1. Permanently install vanes arranged to permit air to make abrupt turn without appreciable turbulence, in 90º elbows of above ground supply and return ductwork.
2. Quiet and free from vibration when system is in operation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Duct Liner:
1. Furnish and install acoustic lining in following types of ducts:
   a. Supply air.
   b. Return air.
   c. Mixed air.
   d. Transfer air.
   e. Relief air.
   f. Exhaust air.
   g. Elbows, fittings, and diffuser drops greater than 12" in length.
   h. Concrete underfloor boxes.

B. Flexible Connections: Install flexible inlet and outlet duct connections to each furnace.

C. Access Doors in Ducts:
1. Install at each manual outside air damper and at each motorized damper. Locate doors within 6" of installed dampers.
2. Install within 6" of fire dampers and in Mechanical Room if possible. Install on side of duct that allows easiest access to damper.

D. Dampers and Damper Accessories:
1. Install concealed ceiling damper regulators.
   a. Paint cover plates to match ceiling tile.
   b. Do not install damper regulators for dampers located directly above removable ceilings or in Mechanical Rooms.
2. Provide each take-off with an adjustable volume damper to balance that branch.
   a. Anchor dampers securely to duct.
   b. Install dampers in main ducts within insulation.
   c. Dampers in branch ducts shall fit against sheet metal walls, bottom and top of duct, and be securely fastened. Cut duct liner to allow damper to fit against sheet metal.
   d. Where concealed ceiling damper regulators are installed, provide cover plate.
3. Install motorized dampers.

END OF SECTION 23 3300

SECTION 23 3400
EXHAUST FANS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

B. Section 230501 Basic Mechanical Materials and Methods sections apply to work of this section.

1.2 SUMMARY

A. Includes but not limited to
   1. Furnish and install exhaust fans as described in Contract Documents.

1.3 QUALITY ASSURANCES

A. Requirements of Regulatory Agencies -
   1. Bear AMCA seal and UL label.

PART 2 PRODUCTS

2.1 CEILING MOUNTED EXHAUST FANS

A. Acoustically insulated housings.

B. Include shatterproof integral back-draft damper with no metal to metal contact.

C. True centrifugal wheels.

D. Entire fan, motor, and wheel assembly shall be easily removable without disturbing housing.

E. Suitably ground motors and mount on rubber-in shear vibration isolators.

F. Provide wall or roof cap, as required.

G. Approved Manufacturers
   1. Cook-Gemini
   2. Greenheck Sp
   3. Panasonic

2.2 ROOF MOUNTED SMOKE AND HEAT EXHAUST

A. Provide fusible link damper to automatically open the butterfly dampers when the air temperature below the damper blades exceeds 165° F to provide smoke and heat relief with no electrical power required.

B. All structural steel components shall be coated with Penn-Tector™ thermally fused polyester.

C. Fan shaft shall be turned, precision ground and polished steel sized so that the first critical speed is at least 25% over the maximum operating speed.

D. Install a heat slinger mounted to the fan shaft between the propeller and the bearing cover to dissipate heat from the fan shaft and to draw cooling air over the bearings, shaft and drive.

E. Standard heavy duty bearings shall be self-aligning ball type in pillow block mounts. Bearings rating shall be in excess of 200,000 hours.

F. Provide extended lubrication lines with grease fittings to permit east of bearing lubrication.

G. Drives shall be multiple groove, machined cast iron, sized for a minimum of 150% of driven horsepower. Motor pulleys are adjustable for balancing.

H. Protect bearings and drives from the airstream by welded, heavy gauge steel belt tubes and bolted bearing covers.

I. Mount heavy duty ball bearing motors out of the airstream.

J. Weatherproof motor covers shall be vented for proper motor cooling.

K. Provide vented, pre-fabricated metal corrugated roof curb for flat or sloped roof as shown on drawings.

L. Curb mounted weather proof disconnect switch.

M. Approved manufacturers
   1. Fans and curbs
      a. PennBarry
      b. Cook
      c. Greenheck
      d. Jenn-Air

PART 3 EXECUTION

3.1 INSTALLATION

A. Anchor fan units securely to structure or curb.

END OF SECTION 23 3400

SECTION 23 3710
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

B. Section 230501 - Basic Mechanical Materials and Methods sections apply to work of this section.

1.2 SUMMARY

A. Includes but not limited to

1. Furnish and install wall supply registers, return air grilles, ceiling diffusers, louvers connected to ductwork, and registers as described in Contract Documents.
2. Quality of grilles installed in metal doors.

B. Products furnished but not installed under this section

1. Door grilles for wood doors.

1.3 MAINTENANCE

A. Extra Materials

1. Leave tool for removing core of each different type of grille for building custodian.

PART 2 PRODUCTS

2.1 SUPPLY GRILLES & REGISTERS

A. Approved Manufacturers

1. Air Control Products
2. Krueger
3. Metalaire
4. Titus
5. Tuttle & Bailey
6. Price
7. Greenheck

2.2 CEILING EXHAUST/RETURN

A. Approved Manufacturers

1. Air Control Products
2. Anemostat
3. Krueger
4. Metalaire
5. Titus
6. Tuttle & Bailey
7. Price

2.3 FLOOR RETURN GRILLES

A. Approved Manufacturers

1. Air Control Products
2. Anemostat
3. Kruegar
4. Metalaire
5. Titus
6. Tuttle & Bailey
7. Price
8. Greenheck

2.4 CEILING DIFFUSERS

A. Approved Manufacturers

1. Air Control Products
2. Krueger
3. Titus
4. Tuttle & Bailey
5. Price

PART 3 EXECUTION

3.1 INSTALLATION

A. Anchor securely into openings.

END OF SECTION 23 3710

SECTION 23 3713
DIFFUSERS, REGISTERS, AND GRILLES

PART 1 GENERAL

1.1 SUMMARY

A. Includes but not limited to:
   1. Furnish and install diffusers, registers, and grilles connected to ductwork as described in Contract Documents.

1.2 MAINTENANCE

A. Extra Materials: Leave tool for removing core of each different type of grille for building custodian.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

A. Supply Grilles and Registers:
   1. Finish: Off-white baked enamel.
   2. Removable core.
   3. Category Four Approved Products. See Section 010000 for definitions of Categories.
      a. Carnes
      b. J & J
      c. Krueger
      d. Metal*Aire
      e. Nailor
      f. Price
      g. Titus
      h. Tuttle & Bailey.
      i. Greenheck

B. Ceiling Return and Transfer Grilles:
   1. Finish: Off-white baked enamel.
   2. ½” spacing.
   3. Category Four Approved Products. See Section 010000 for definitions of Categories.
      a. Carnes
      b. J & J
      c. Krueger
      d. Metal*Aire
      e. Nailor
      f. Price
      g. Titus
      h. Tuttle & Bailey
      i. Greenheck

C. Floor Return Grilles:
   1. Finish: Clear anodized.
   2. Category Four Approved Products. See Section 010000 for definitions of Categories.
      a. Carnes
      b. J & J
      c. Krueger
      d. Metal*Aire
      e. Nailor
      f. Price
      g. Titus
      h. Tuttle & Bailey
      i. Greenheck

D. Ceiling Diffusers:
   1. Finish: Off-white baked enamel.
   2. Category Four Approved Products. See Section 010000 for definitions of Categories.
      a. Carnes
      b. J & J
      c. Krueger
      d. Metal*Aire
      e. Nailor
      f. Price
      g. Titus
      h. Tuttle & Bailey
      i. Greenheck

2.2 MANUFACTURERS

A. Contact Information:
   1. Carnes Co, Verona, MI www.carnes.com
   2. J & J Register, Holland, MI www.jandjreg.com.
   3. Krueger Air System Components, Richardson, TX www.krueger-hvac.com.
   4. Metal*Aire by Metal Industries Inc, Clearwater, FL www.metalaire.com.
   5. Nailor Industries Inc, Houston, TX or Weston, ON www.nailor.com.
   6. Price Industries Inc, Suwanee, GA www.price-hvac.com.
   7. Titus, Richardson, TX www.titus-hvac.com.
   8. Tuttle & Bailey, Richardson, TX www.tuttleandbailey.com.
   9. Greenheck www.greenheck.com

PART 3 EXECUTION

3.1 INSTALLATION

A. Anchor securely into openings. Secure frames to ductwork by using four sheet metal screws, one per side. Level floor registers and anchor securely into floor.

3.2 ADJUSTING

A. Set sidewall supply register blades at 15° upward deflection.

END OF SECTION 23 3713

SECTION 23 3715
ROOF MOUNTED AIR INLETS & OUTLETS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

B. Division 230501 - Basic Mechanical Materials and Methods sections apply to work of this section.

1.2 SUMMARY

A. Includes but not limited to
   1. Furnish and install roof vents as described in Contract Documents.

PART 2 PRODUCTS

2.1 FABRICATION

A. Hood type of extruded aluminum complete with roof curb to fit slope of roof and ½" mesh 16-gauge aluminum bird screen.

B. Finish as specified by Architect.

2.2 APPROVED MANUFACTURERS & MODELS

A. Tiered Louvered Penthouse
   1. Model RLX by Breidert Co, Little Rock, AR
   2. Model WRH by Greenheck Fan Corporation, Schofield, WI
   3. Model MPH by Jenn-Air Industries Inc., Indianapolis, IN
   4. Model TRE by Loren Cook Company, Springfield, Missouri

B. Low Profile Hood
   1. Model GR by Loren Cook Company, Springfield, Missouri
   2. Model FGR (relief) by Greenheck Fan Corporation, Schofield, WI
   3. Model AEG relief by Pennbarry, Plano, TX.
   4. Model GE relief by Cornes Company, Verona, WI

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with Manufacturer's recommendations.

END OF SECTION 23 3715

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SECTION 23 5705
SPLIT TYPE HEAT PUMPS, CONDENSERS, AND FAN COILS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

B. Section 230501 - Basic Mechanical Materials and Methods sections apply to work of this section.

1.2 SUMMARY

A. Includes but not limited to

1. Furnish and install heat pumps as described in Contract Documents.

1.3 SUBMITTALS

A. Warranty

1. Submit copy of specified warranty.

1.4 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies -

1. Each unit shall be UL or ETL labeled.

1.5 WARRANTY

A. Five-year warranty on compressors with permanent label on unit showing expiration date.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

A. Indoor Units

1. Compact wall, ceiling mounted, and ducted units.
2. Supplementary electric heater, size as scheduled.
3. Cabinet Finish as selected by Architect.
4. Isolate moving parts from cabinets to reduce noise.
5. Built-in condensate pump. Supply separately when not available.
6. Flared refrigeration connections.
7. 360º airflow panel. (Cassette only)
8. Fresh air intake connection.

B. Outdoor Units

1. Compressor shall be of rotary design.
2. Fans shall be direct driven and discharge horizontally.
3. Casing shall be fully weatherproof for outdoor installations.
4. Microprocessor Controls shall be factory wired with programmable field wired wall remote thermostat.
5. Refrigerant shall be R-32 or R-454B.
6. Isolate moving parts from cabinets to reduce noise.
7. Use dry-charged tubing for connection of unit's refrigerant system.
8. Provide heat pump with 12” high stand and condensers with 6” stand.
9. Unit shall be rated for -20°F.
10. Provide wind baffle.

C. Approved Manufacturers & Models

1. Mitsubishi Electric
2. Sanyo Electric Inc
3. Lennox
4. Carrier
5. Trane
6. LG
7. Daikin
8. Fujitsu
9. Samsung

PART 3 EXECUTION

3.1 Field Quality Control

A. Manufacturer's Field Service-

1. Heat pump units shall be started up, checked out, and adjusted by Unit Manufacturer's authorized factory trained service mechanic.
   a. Mechanic shall use check-out sheet provided by Manufacturer, complete and sign all items on sheet, and submit to Architect.
   b. Install, anchor and support heat pump/condenser, piping, fan coils, controls, and power. Installation shall be clean looking in appearance.
   c. Final payment will not be made until check-out sheet is received by Area Office.

END OF SECTION 23 5705

DIVISION 26
ELECTRICAL INDEX

No.	Section	No. of Pages
260000	**ELECTRICAL**	
260501	COMMON ELECTRICAL REQUIREMENTS	15
	SUBSTITUTIONS AND SUBSTITUTE EQUIPMENT (260501-12)	
260508	BASIC ELECTRICAL MATERIALS AND METHODS	2
260510	EXISTING FACILITIES AND EQUIPMENT	1
260519	LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES	5
260520	ELECTRICAL WIRING CONNECTIONS	2
260526	GROUNDING AND BONDING	2
260529	CONCRETE PLATFORMS AND BASES	1
260533A	RACEWAYS FOR ELECTRICAL SYSTEM	6
260534A	BOXES, PULL BOXES, CONDUIT BODIES AND FITTINGS	3
260548	ELECTRICAL SUPPORTS AND SEISMIC RESTRAINTS	5
260553	ELECTRICAL IDENTIFICATION	1
260800	COMMISSIONING OF ELECTRICAL SYSTEMS	3
260923	LIGHTING CONTROL DEVICES	2
262000	**LOW (LINE) VOLTAGE DISTRIBUTION**	
262416	PANELBOARDS	3
262726	WIRING DEVICES	4
262816	ENCLOSED SWITCHES AND CIRCUIT BREAKERS	2
262910	OVERCURRENT PROTECTIVE DEVICES	2
265000	**LIGHTING**	
265100	INTERIOR LIGHTING	3
265200	EMERGENCY LIGHTING	1

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SECTION 26 0501
COMMON ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 01 Specification sections, apply to work of this section.

B. This is Division 26 of the project specifications; this coupled with the drawings are to be used in the construction of this project. Each section recorded hereafter makes reference to the electrical systems, equipment, materials, connections, etc., and apply to all the work making reference and/or titled Electrical and/or Electrical Contract Documents.

C. Architectural, Structural, Plumbing, Mechanical and other applicable and related documents are considered a part of the electrical documents insofar as they apply as if referred to in full.

1.2 SCOPE OF WORK

A. The scope of this project is to construct a complete electrical system for the Spring Creek Middle School. Each area shall be developed electrically to give proper illumination, power utilization, auxiliary networks, etc. When the project is complete all systems integrate into a total electrical network making the building a usable facility.

B. The auxiliary systems: Sound Reinforcing, Intercommunication (includes class control), Telephone, Fire Alarm, Data, Security etc., cover the entire indicated facility and must function as a unit to meet the needs of all occupants. Thence, the equipment supplier, the installer, and the constructor shall work toward that end. Anything short of this objective will not meet the intent of the project, i.e., each system shall be complete and effectively perform the function for which it was designed.

C. Extent of electrical work is indicated on drawings and/or specified in Divisions 26-28 sections of the specification. Provide all labor, materials, equipment, supervision and service necessary for a complete electrical system. Work includes, but is not necessarily limited to, the following items:

1. 260508 - Basic Electrical Materials and Methods
2. 260510 - Existing Facilities and Equipment
3. 260519 - Low Voltage Electrical Power Conductors and Cables
4. 260520 - Electrical Wiring Connections
5. 260526 - Grounding and Bonding
6. 260529 - Concrete Platforms and Bases
7. 260533 - Raceways for Electrical System
8. 260534 - Boxes, Pull Boxes, Conduit Bodies and Fittings
9. 260548 - Electrical Supports and Seismic Restraints
10. 260553 - Electrical Identification
11. 260800 - Commissioning of Electrical Systems
12. 260923 - Lighting Control Devices
13. 262416 - Panelboards
14. 262726 - Wiring Devices
15. 262816 - Enclosed Switches and Circuit Breakers
16. 262910 - Overcurrent Protective Devices
17. 265100 - Interior Lighting
18. 265200 - Emergency Lighting
19. 270000 -280000 Data, Telephone, Audio, Video, Sound Systems, Clocks, Security Fire Alarm & Detection
20. 270001- 280001 Common Conduit and Vacancy Systems for Communications

21. 270500 - Telephone Conduit and Boxes
22. 270510 - Telephone Equipment and Cabling System
23. 271000 - Data Conduit and Boxes (Conduit Only)
24. 275123 - Building Intercom System Expansion
25. 281000 - Electronic Access Control
26. 283123 - Fire Alarm System

D. Use of standard industry symbols together with the special symbols, notes, and instructions indicated on the drawings describe the work, materials, apparatus, and systems required as a portion of this work.

E. Divisions 27 & 28 shall be bid with Division 26 as many of the conditions stated there in are found in Division 26. Namely, conduit, boxes, support, seismic bracing, etc. **Do not separate Division 26 from Divisions 27 & 28, they are all one contract.**

1.3 CONTRACT DOCUMENTS AND EXAMINATION OF THE SITE

A. Each bidder shall study the construction documents (plans and specifications), visit the site of the proposed work to fully acquaint himself with the conditions relating to the construction, so that he understands the difficulties and restrictions attending the execution of the work to be placed under contract. From all the above information, together with the cost of equipment, materials, labor, etc., the bidder shall then assemble and submit his cost to complete the project. The failure or omission of any bidder to receive or examine any contract documents, form, instrument, addendum or other document or to visit the site and acquaint their self with existing conditions shall in no way relieve any bidder from obligations with respect to his bid or to the contract. Written addendums (formally issued) become a part and parcel to the construction documents. The submission of a bid shall be taken as prima facie evidence of compliance with this section.

1.4 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

A. Any person contemplating submitting a bid shall familiarize himself with the drawings, specifications and project site. If for any reason, the bidder of the proposed contract, is in doubt as to the true meaning of any part of the drawings, specifications, or other contract documents, or finds discrepancies in, or omissions from, the drawings and specifications he shall submit a written request for an interpretation, correction and/or clarification to Architect/Engineer. The person submitting the request shall be responsible for its prompt delivery. **Any interpretation or correction of the contract documents prior to bid shall be made only by addenda duly issued**. An oral statement by anyone on any provision in the contract documents prior to the bidding is declared invalid.

B. After acceptance of the contract, the Contractor shall meet the intent, purpose and function of the contract documents and **no changes shall be made to the contract documents, except it be in writing and/or a drawing, over the signature of the engineer and/or his representative**. Any costs of materials, labor and equipment arising therefrom, shall be made known to the owner's representative (Project Manager and/or the General Contractor) within 24 hours or the costs become the responsibility of the Contractor.

1.5 LAW AND REGULATION

A. The bidder's attention is directed to the fact of all applicable laws, ordinances and rules and regulations of all authorities having jurisdiction over construction of the project shall apply to contract throughout, and they shall be deemed to be included in the contract of the same as though here written out in full.

1.6 CONSTRUCTION OBSERVATIONS

A. During the course of construction of this project, the engineer shall visit the project site periodically on an as-needed basis. The construction observation intervals may vary depending on the progress and/or stage of construction and to observe the electrical conduit rough-in above or below grade, setting of the main and branch panels, auxiliary units and panels, surface mounted items, setting of equipment, equipment connections, etc. However, written field questions are encouraged and welcomed throughout the course of construction and shall be answered promptly in writing, to keep the project construction on schedule. The project foreman should have the building plans, construction schedules, etc., affixed in mind, so the electrical systems being assembled, the setting of equipment, of parts and pieces, related to the project are anticipated, to prevent delays or emergencies.

B. The engineer shall make one (1) final inspection. The contractor shall notify the engineer that the installation is complete, i.e., the systems are operating and have been tested and balanced, and everything is complete and operational, all equipment connections have been made and the owner's representatives have been trained. At this time the engineer, the contractor, and the owner's representative shall schedule a time to walk the project for evaluation, and record in writing the items found to be incomplete. The contractor shall make the corrections within one (1) week after this inspection. If at the conclusion of the observation tour the owner and engineer determine that additional visits are required to complete the project, **the contractor shall reimburse the engineer at the rate of $600 for each site visit required, plus out of pocket expenses, until all items are acceptable to the engineer and owner. The contractor shall pay the engineer in advance of each inspection.**

C. Before scheduling an additional visit, the contractor shall report to the engineer that all systems are complete, and the project is ready for the owner's acceptance.

1.7 OFFICIAL, AGENT AND EMPLOYEES OF THE OWNER NOT PERSONALLY LIABLE

A. It is agreed, by and between the parties hereto that in no event shall any official, officer, employee, or agent of the Owner in any way be personally liable or responsible for any covenant or agreement herein contained whether expressed or implied, nor for any statement, representation or warranty made herein or in any connection with this agreement.

1.8 SUBLETTING AND SUBCONTRACTING

A. This Bidder is responsible for the construction stated or defined in this Contract and, as such, shall abide by the Subletting and Subcontracting Fair Practices Act as set forth and outlined in the General Conditions, Designation of Subcontractors.

1.9 CONTRACTOR COORDINATION

A. In the course of installing the systems defined in the contract documents, the contractor shall closely follow the plans, details and specifications (contract documents). The system design has been a careful and laborious undertaking, with the intent purpose of producing a system and/or systems that will serve the owner well with minimum maintenance. The contractor shall adhere as close as possible to the plans, details, and specifications for each system. Questions and suggestions are encouraged as the project is being assembled. If for any reason, the contractor desires to deviate from the defined information, because he discovers a way to improve the system, make the system more easily assembled, make it operate more efficiently, etc., the contractor shall present the changes to the engineer. Systems are designed to perform a specific function; the smallest change in assembly may change the function. If the engineer agrees with the change he will authorize the contractor to proceed. Contractor cooperation and coordination is appreciated. If the contractor proceeds with construction without the designer's authorization, it shall be reworked, in accordance to plans and specifications, at the contractor's expense.

1.10 QUALITY ASSURANCE

A. Comply with the requirements of State and Local Ordinances. If a conflict occurs between these requirements and the contract documents, the most stringent requirements shall govern. The contractor accepts this responsibility upon submitting his bid, and no extra charge will be allowed after the contract is awarded. This shall not be construed as relieving the Contractor from complying with any requirements of the contract documents which may be in excess of the aforementioned requirements, and not contrary to same.

B. Obtain all permits, inspections, etc. required by authority having jurisdiction. Include all fees in bid. Furnish a certificate of approval to the Owner's Representative from the Inspection Authority at completion of the work.

C. Employ only qualified craftsmen with at least three years of experience (in power equipment, conduit work, high voltage equipment, etc.). Workmanship shall be neat, have a good mechanical appearance and conform to best electrical construction practices (Media Standards of Installation). Provide a competent superintendent to direct the work at all times. Any person found incompetent by the General Contractor, Engineer, Architect, or Owner, shall be discharged from the project and replaced by satisfactory personnel.

D. Contractor shall have a current state contracting license applicable to type of work to be performed under this contract.

1.11 MATERIALS AND WORKMANSHIP

A. All materials and equipment furnished and installed shall be first quality, new and meet the standards of NEMA, IPCEA, LS, UL, NFPA, UBC, OSHA, NEC, and shall bear their label wherever standards have been established and label service is available. Where materials and equipment are specified by manufacturer's name, the type and quality required is thereby denoted. The Architect shall be afforded every facility deemed necessary to inspect and examine the materials and apparatus being installed to prove the material quality and skill/competency of workmanship.

1.12 DEMOLITION, PATCH AND REPAIR

A. The Contractor is responsible for all block-outs, demolition, patching and repair of all finished interior surfaces pertaining to the installation of this particular phase of work. All repaired surfaces shall be finished (painted, etc.) to match the adjacent materials, finished and color.

B. When conduit passes through a ceiling and/or floor, block-out as required and/or core drill - do not break out with a hammer of any type. The hole shall not be larger than ½" more than the diameter of the conduit.

C. When conduit is indicated to be installed below an existing concrete slab, cut the slab with a diamond saw and/or cutting tool. Do not just rip up the surface unless the entire section is removed.

D. When conduit is to be installed below asphalt, concrete, lawn, etc. the surface shall be cut, not ripped up, with a back-hoe or other equipment (i.e., mechanically cut then remove material).

E. Seal around all electrical equipment penetrating outside walls, roofs, unheated spaces, air plenums, cold boxes, etc., with Dow Corning Silicone RTV foam.

F. All salvageable electrical equipment and materials that cannot be integrated into the new electrical network become the property of the Contractor and shall be removed from the premise.

G. Hard Surfaces: whenever demolition or excavation is required for the installation of the electrical system, it is the responsibility of the Contractor to make repairs and/or replacement of hard finish surfaces such as concrete, asphalt, etc.

H. The method of patching and repair shall follow good construction practices. All finished surfaces shall match materials, and finish (surface texture and finish - paint, etc.) wherein the demolition occurred.

I. Lawn replacement resulting from excavation is to be included in the bid.

1.13 EXCAVATION, BACKFILL AND BORING

A. The Electrical Contractor is responsible for all excavation and backfill related to the installation for Division 26. All work shall comply with the conditions stated herein and those noted in the Architectural Section under Earthwork.

B. When conduit is indicated to be installed below an existing concrete slab, cut the slab with a diamond saw and/or cutting tool. Do not just rip up the surface unless the entire section is removed.

C. Backfill: The Contractor shall backfill the excavated areas with the material removed provided it does not contain rocks larger than 0.15” in diameter. If the excavated material is larger than indicated, the excavated area shall be filled with sand.

D. Backfill materials shall be put in place in 4” lifts and compacted to 98% of the maximum dry density of ASTM 698 over the entire area of the fill.

E. After the backfill is complete the finished surface shall match the adjacent surfaces, depth, quality finish, etc. (concrete, etc.).

F. Boring, or Auging - The contractor shall employ a firm skilled in installing underground utilities - piping, conduit, etc. for at least five (5) years, with care and concern the contractor shall drive the boring tool under the bleachers with care and concern. Any damage to the existing facility shall be repaired at the expense of the Boring Contractor. The installation shall follow and comply with the intent and details shown or the plans.

1.14 PROGRESS AND COORDINATION OF WORK

A. The electrical work shall be laid out in advance of construction to eliminate unnecessary cutting, drilling, channeling, etc. Perform necessary cutting, drilling, or channeling with care. Use skilled mechanics of the trades involved and repair damage to building or equipment at no additional cost to the Owner. Cutting, drilling, or channeling through work performed by other trades shall only be done with the consent of the General Contractor. Cutting, drilling, or channeling through structural members shall only be done with the approval of the Architect.

B. Cooperate with other trades to coordinate locations of electrical outlets and apparatus.

C. Perform for other trades, the electrical wiring and connections for all devices or apparatus where not specified herein or indicated on the drawings. Consult the Architectural and Mechanical drawings to avoid hiding switches, outlets and other equipment behind doors, cabinets, counters, heating equipment, etc. Buried electrical devices and/or connections shall be relocated as directed by Engineer and/or authority having jurisdiction, at no additional cost to the Owner.

D. Where conduit, outlets or apparatus are to be cast in concrete or encased, it must be located and secured by a journeyman or foreman present at the point of installation. He shall check the locations of the electrical items before and after the concrete and masonry installation and shall relocate displaced items.

E. No changes shall be made in the design or location of apparatus unless specifically approved in writing.

1.15 COORDINATION WITH CEILING AND MECHANICAL SUBCONTRACTORS

A. Meet at least twice with the Ceiling Contractor. The first meeting shall accomplish coordination of all ceiling types with the specified light fixtures. The second meeting shall be held at the project site prior to installing the ceiling to coordinate the fixture layout in each area, and to determine if the depth will allow the installation of the fixture. If a conflict occurs with the layout or depth, the Engineer shall be contacted immediately so the conditions can be adjusted. A letter confirming the second meeting shall be sent to the Engineer with a copy to the Architect.

B. Meet at least once with the Mechanical Contractor prior to fabrication and installation of the ductwork to coordinate the depth and location of light fixtures and ductwork in all areas. All conflicts must be resolved before light fixtures are released for shipment. A letter confirming this meeting shall be sent to the Engineer with a copy to the Architect.

1.16 WIRING DIAGRAMS

A. As soon as possible after the contract to proceed is signed, one print of the control diagrams shown on the contract documents shall be developed (utilize the information on the contract documents) and Control Subcontractors, showing all necessary connections required for the equipment and devices proposed for installation. These prints shall be reviewed and approved by the Mechanical, Electrical, and Controls Subcontractor, and then submitted to the Architect/Engineer for approval. The prints shall indicate all components that are to be wired into the control power circuit by the Electrical Subcontractor, with all terminals for external connections of the components identified and labeled to correspond to the manufacturer's designations. Internal or factory installed wiring or package-type components need not be shown. The shop drawings for the Control System to be installed by the Controls Subcontractor shall be prepared as a separate and complete submittal and need not be entirely repeated on the indicated prints except for the related electric connection. Color coding designations shall be indicated on the control power circuit wiring to be installed in the field by the Electrical Contractor.

B. Revised Drawings: After the Architect has approved the submitted copy of the control diagrams, the contract drawings will be revised, and the Contractor will be issued ten revised prints. The revised control diagrams shall be certified in writing as being acceptable to the Mechanical Design Engineer, Electrical Design Engineer, Mechanical Contractor, Electrical Contractor, and the Controls Contractor. The contract drawings will be revised by one of the two following procedures:
   1. If the revisions to the controls diagram shown on the contract drawings are minor in the opinion of the Architect, the contract drawings will be revised and re-issued by and at the expense of the Architect.
   2. If the revisions to the control diagrams shown on the contract drawings are ruled major in the opinion of the Architect/Engineer, the Prime Contractor shall prepare and submit a complete set of reproducible drawings of the control diagrams proposed for installation. These drawings shall be prepared on the same size sheets as the contract drawings and shall follow the same general format and quality of drafting as the contract drawings. After these reproducible drawings have been reviewed, approved and certified by the Architect/Engineer, the revised prints will be re-issued to the Contractor at the expense of the Design Engineers.

C. Changes During Construction: The complete responsibility and costs for changes to the approved control diagrams during construction and the resultant changes to the installation requirements not covered by contract change orders, shall be assigned to the respective section of these specifications under which the equipment is furnished.

1.17 SUBMITTALS OF EQUIPMENT FOR APPROVAL

A. SHOP DRAWINGS AND PRODUCT DATA BEING INSTALLED IN THE PROJECT: After the contract is awarded, but prior to manufacture or installation of any equipment, prepare complete Shop Drawings and Brochures for materials and equipment as required by each section of this specification. A brief submittal description of equipment that is approved for installation (bid documents or addendums), is given below. Refer to identified sections for detailed submittal requirements.

1 Common Electrical Requirements (Section 260501)
2 Basic Electrical Materials and Methods (Section 260508)
3 Existing Facilities and Equipment (Section 260510)
4 Conductors and Cables (Section 260519)
5 Electrical Wiring Connections (Section 260520)
6 Grounding and Bonding (Section 260526)
7 Concrete Platforms and Bases (Section 260529)
8 Raceways for Electrical System (Section 260533)
9 Boxes, Pull Boxes, Conduit Bodies and Fittings (Section 260534)
10 Electrical Supports and Seismic Restraints (Section 260548)
11 Electrical Identification (Section 260553)
12 Commissioning of Electrical Systems (Section 260800)
13 Lighting Control Devices (Section 260923)
14 Panelboards (Section 262416)
15 Wiring Devices (Section 262726)
16 Enclosed Switches and Circuit Breakers (262816)
17 Overcurrent Protective Devices (Section 262910)
18 Interior Lighting (Section 265100)
19 Emergency Lighting (Section 265200)
20 Data, Telephone, Audio-Video Sound Systems, Security, Fire Alarm and Detection (Section 270000-280000)
21 Common Conduit and Vacancy Systems for Communications (Section 270001-280001)
22 Telephone Conduit and Boxes (Section 270500)
23 Telephone Equipment and Cabling System (Section 270510)
24 Data Conduit and Boxes (Section 271000)
25 Building Intercom System Expansion (Section 275123)
26 Electronic Access Control (Section 281000)
27 Fire Alarm System Expansion (Section 283123)

This list is not all inclusive. The contractor shall submit product information for all items being installed on the project, contained in the drawings or elsewhere in this specification.

B. The electrical foreman, to acquaint himself with the project, is asked to review the shop drawings prior to submission to confirm size, voltages, loads, etc. **This cooperative effort** will prevent problems from occurring during the course of construction. Any problems that may arise shall be phoned to the engineer and noted in writing and submitted with the shop drawings.

C. Submit project information in electronic format per architectural submission requirements.

D. A minimum period of two weeks, exclusive of transmittal time, will be required each time a Shop Drawing and/or Brochure is submitted or resubmitted for review. This period shall be considered by the Contractor when scheduling submittal data.

E. Review of Shop Drawings and Brochures shall not relieve the Contractor of responsibility for dimensions and/or errors that may be contained therein, or deviations from the Contract Document's requirements. It shall be clearly understood that the noting of some errors but overlooking others does not grant the Contractor permission to proceed in error. Regardless of any information contained in the Shop Drawings and Brochures, the requirements of the Contract Documents shall govern and are not waived or superseded in any way by the review of the Shop Drawings and Brochures.

F. Certifications shall be written or in the form of rubber stamp impressions as follows:

I hereby certify that this Shop Drawing and/or Brochure has been checked prior to submittal and that it complies in all respects with the requirements of the Contract Drawings and Specifications for this Project.

(Name of Electrical Subcontractor)

Signed _____

Position _____ Date _____

Observe the following rules when submitting Shop Drawings and Brochures.

1. Each Shop Drawing shall indicate in the lower right hand corner, and each Brochure shall indicate on the front cover the following: Title of the sheet or brochure, name and location of the building; names of the Architect and Electrical Engineer, Contractor, Subcontractors, Manufacturer, Supplier/Vendor, etc., date of submittal, and the date of correction and revision. Unless the above information is included, the submittal will be returned for re-submittal.
2. Shop Drawings shall be done in an easily legible scale and shall contain sufficient plans, elevations, sections, and isometrics to clearly describe the equipment or apparatus, and its location. Drawings shall be prepared by an Engineer/Drafter skilled in this type of work. Shop Drawings shall be drawn to at least ¼"-1-0" scale.
3. Brochures to be submitted shall be published by the Manufacturers and shall contain complete and detailed engineering and dimensional information. Brochures submitted shall contain only information relevant to the particular equipment or materials to be furnished. The Contractor shall not submit catalogs which describe several different items in addition to those items to be used, unless all irrelevant information is marked out, or unless relevant information is clearly marked. Brochures from each manufacturer shall be identified and submitted separately.

1.18 OPERATION AND MAINTENANCE MANUALS

A. Provide operating instructions and maintenance data books for all equipment and materials furnished under this Division.

B. Submit operating and maintenance data books for review at least four weeks before final review of the project. Assemble all data in a completely indexed volume or volumes and identify the size, model, and features indicated for each item. Comply with architectural submission requirements.

C. Include complete cleaning and servicing data compiled in clearly and easily understandable form. Show serial numbers of each piece of equipment, complete list of replacement parts, motor ratings, etc. Each unit shall have its own individual sheet. (Example: If two items of equipment A and D appear on the same sheet, an individual sheet shall be provided for each unit specified.)

D. Include the following information where applicable:
   1. Identifying name and mark number.
   2. Certified outline Drawings and Shop Drawings.
   3. Parts list.
   4. Performance curves and data.
   5. Wiring diagrams.
   6. Manufacturer's recommended operating and maintenance instructions.
   7. Vendor's name and address for each item.

1.19 RECORD DRAWINGS

A. Maintain at the job site, on a daily basis, a complete set of "Record Drawings", reflecting an accurate dimensional record of all buried or concealed work. Mark "Record Drawings" to show the precise location of concealed work and equipment, including concealed or embedded conduit and junction boxes and all changes and deviations in the work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite authorization for such changes. The "Record Drawings" for daily recording shall consist of a set of blue line prints of the Contract Drawings.

B. Record dimensions clearly and accurately, delineating the work as installed; identify locations by at least two dimensions to permanent reference points.

C. Certify the "Record Drawings" for correctness by placing and signing the following certifications on the first sheet:

"CERTIFIED CORRECT (3/8" high letters)

By _____ Date _____
(Name of General Contractor)

By _____ Date _____
(Name of Electrical Contractor)

D. GUARANTEE: Ensure that electrical system installed under this contract is in proper working order and in compliance with drawings, specifications and/or authorized changes. Without additional charge, replace any work or materials which develop defects, except from ordinary wear and tear, within one year from the date of substantial completion. Exception: Incandescent and fluorescent lamps shall be guaranteed for a period of two months from the date of substantial completion.

1.20 CLEAN-UP

A. Clean up all equipment, conduit, fittings, packing cartons and other debris that is a direct result of the installation of the work of this Division.

B. Clean luminaires, interiors and exteriors of all equipment, and raceways. Replace all filters in electrical equipment upon request for Substantial Completion.

1.21 POWER OUTAGE

A. All power outages required for execution of this work shall occur during non-standard working hours and/or at the convenience of the Owner. Include all costs or overtime work in the base bid.

B. Submit written request at least 7 days in advance of scheduled outage and proceed with outage only after receiving authorization from the Owner's Representative.

C. Keep all outages to an absolute minimum.

1.22 STORAGE AND PROTECTION OF MATERIALS

A. Provide storage space for storage of materials and apparatus and assume complete responsibility for all losses due to any cause whatsoever. In no case shall storage interfere with traffic conditions in any public thoroughfare or constitute a hazard to persons in the vicinity. Protect completed work, work under way, and apparatus against loss or damage.

1.23 CONCRETE PADS AND ASPHALT

A. The Electrical Contractor shall provide the concrete (5-bag mix) and/or asphalt except as noted in the contract documents. This may also include that which is needed to replace any and all removed through demolition. It shall match the existing as to type, quality, and thickness.

1.24 ELECTRICAL-MECHANICAL COORDINATION

A. General - All disconnect means, motor controllers, electrical controls, signal devices, etc., for mechanical equipment as noted in Division 23 & 24 of the specifications shall be furnished, installed, wired, and connected under Division 26. All pressure switches, thermostats, solenoid valves, damper motors, smoke duct detectors, etc. shall be supplied and installed under the Mechanical Division for electrical connection under this Division. Connection diagrams will be supplied as hereafter explained.

B. If the substitution of equipment in Division 23 results in a change to the contract documents and/or changes to the installation requirements (not covered by the contract change orders), then the Division 23 contractor shall reimburse the Division 26 contractor for additional work required.

C. If the substitution of equipment in Division 26 results in a change to the contract documents and/or changes to the installation requirements (not covered by the contract change orders), the complete responsibility for costs shall be assigned to the section of these specifications under which the equipment is furnished.

1.25 EQUIPMENT CONNECTION DIAGRAM

A. Submittal data for each individual electrically operated or electrically controlled item of equipment or device furnished under Division 23 & 24 and/or 26 of the contract documents shall include complete electrical wiring diagrams and elementary control diagrams (ladder form) showing all internal and external wiring connections and services. The submittal data shall itemize all electrical characteristics that are of a special nature or critical to the electrical installation or control system. Such equipment and devices will not be considered for approval until these requirements are met.

PART 2 PRODUCTS

2.1 GENERAL

A. PRODUCTS are specified by Manufacturer name, description, and/or catalog number and shall be supplied as such.

B. DISCREPANCIES between equipment specified and the intended function of equipment shall be brought to the attention of the Engineer in writing prior to bidding. Failure to report any conflict, including catalog numbers, discontinued products, etc., does not relieve the Contractor from meeting the intent of the contract documents, nor shall it change the contract cost. If the Contractor is unable to interpret any part of the plans and/or specifications, or should he find discrepancies therein, he shall bring this to the attention of the Engineer, who will issue interpretation and/or additional instructions to Bidders before the project is bid.

C. MANUFACTURERS AND SUBSTITUTE ITEMS: Provide products of manufacturers specified. Manufacturer's catalog numbers and descriptions establish the quality of product required.

D. Provide only equipment specified in the contract documents or approved by addendum.

2.2 LISTED EQUIPMENT

A. Provide and install materials, devices, appliances, equipment, etc. that conforms to applicable standards or is indicated to be acceptable by the established standards of the Underwriter's laboratories, Inc., or other electrical product testing laboratories which are accredited by the department.

B. The statement in Item "A" above is being interpreted by the State Electrical Inspector as follows: It is understood that many specialty items such as power panels, light fixtures, devices and other building components are not available with a UL label covering the entire piece of equipment. The State will impose no requirement that an item of equipment be UL labeled unless it is available as a UL labeled item from at least two manufacturers. Electrical components of unlabeled equipment, such as motors, shall be labeled if they are available from at least two manufacturers.

C. If any building component is available with a UL label from at least two manufacturers, an identical or similar unlabeled component shall not be acceptable for installation. Should any such component be installed, it shall be replaced with a UL labeled component, before the building will be accepted by the Electrical Engineer.

D. Consequently, it shall be the sole responsibility of the Contractor (through project suppliers and equipment manufactures) to purchase and install only equipment bearing the UL label whenever the equipment so labeled is available. The Contractor (should any equipment be installed without the proper UL label) shall bear the entire cost of correction to the satisfaction of the authority having jurisdiction.

2.3 SUBSTITUTIONS AND SUBSTITUTE EQUIPMENT

A. Substitute equipment is encouraged if it is truly an equal to the specified items.
   1. The designer has taken time and effort to analyze, evaluate and prove to himself that the specified unit will perform the function needed, wherein it is placed. This means the responsibility for the function of the specified equipment rests with the designer, who knows and understands what is to be accomplished.
   2. If a **supplier** and/or the **contractor** desire to substitute equipment in place of specified item, he may do so, but he takes upon himself or herself the **full responsibility** that the substituted equipment will equal all of the performing characteristics, functions, etc., and/or exceed the performance of the specified item. The substitute equipment shall be of such a physical size and weight that it will mount in the designated location without alterations to the building and the structure will carry the load. If for any reason the substituted equipment requires alterations or modification, in any form to the building and/or the structure, the costs shall be paid by the contractor and/or those requesting the substitutions.

3. Those interested in requesting a substitution shall state the Manufacturer's catalog numbers and descriptions establish the quality of product required. **Substitutions will be considered if a written application is at the office of the Engineer eight (8) working days prior to day of bidding. The application shall include the following: 1) A statement certifying that the equipment proposed is equal to that specified; that it has the same electrical and physical characteristics, compatible dimensions, and meets the functional intent of the contract documents; 2) The specified and submittal catalog numbers of the equipment under consideration; 3) A pictorial and specification brochure.**
4. Because of the short bidding period, (from issuance of drawing to bid date), between the substitution request and the bid date, the designer does not have adequate time to make a full evaluation of substitute equipment. Therefore, **those requesting the substitution** must accept **full responsibility** for the items being submitted for substitution (operating characteristics, physical size, weight, output, not increase the load, etc.). If at any time during the course of construction, **even up into the final completion,** if the designer finds the equipment does not meet the design criteria, comply with the performance, etc., **those requesting the substitution and the contractor have the responsibility to remove the substituted equipment and install the specified item at their expense.** There shall be no cost assessed to the owner and/or the designer and **the replacement will not delay the completion of the project.**
5. **Discrepancies** between equipment specified and the intended function of equipment shall be brought to the attention of the Engineer in writing prior to bidding. Failure to report any conflict, including catalog numbers, discontinued products, etc., does not relieve the Contractor from meeting the intent of the contract documents, nor shall it change the contract cost. If the Contractor is unable to interpret any part of the plans and/or specification, or should he find discrepancies therein, he shall bring this to the attention of the Engineer, who will issue interpretation and/or additional instruction to Bidders before the project is bid.
6. Any **conflict** arising from the use of **substituted equipment shall be the responsibility of the contractor,** who shall bear all costs required to make the equipment comply with the intent of the contract documents.
7. **Samples** may be required for non-standard or substituted items before installation during construction. Provide all samples as required.
8. **No materials or apparatus** may be substituted after the bid opening, except where the equipment specified has been discontinued. This substitution may be made by a change order.
9. Approved equipment shall be so noted, in writing in a formally issued **Project Addendum.**

2.4 INCENTIVE BIDS AND UNIT PRICES

A. Suppliers of materials, equipment, and systems are encouraged to submit incentive bids by grouping several products under one bid. However, at the request of the Architect and/or Engineer, the supplier shall submit a unit price to add or delete a particular unit, (panel, luminaire, fire alarm panel, etc.) from his quotation so that other components might be considered in the bid.

2.5 SPARE PARTS

A. Provide spare parts (fuses, overload heaters, etc.) as specified. Transmit a list indicating all spare parts to Owner's Representative prior to substantial completion. Submit copy of transmittal letter to Engineer.

B. Fuses: Provide one spare set of fuses for each size and one spare set of each additional group of five.

C. Thermal Overloads: Provide one spare set of thermal overload heaters of each type used in the magnetic starters.

D. Auxiliary Systems: One (1) spare heat detector and three (3) smoke detectors shall be provided for the system.

PART 3 EXECUTION

3.1 INSTALLATION

A. Layout electrical work in advance of construction to eliminate unnecessary cutting, drilling, channeling, etc. Where such cutting, drilling, or channeling becomes necessary for proper installation; perform with care. Use skilled mechanics of the trades involved. Repair damage to building and equipment at no additional cost to the contract. Cutting work of other Contractors shall be done only with the consent of that Contractor. Cutting structural members shall not be permitted.

B. Since the drawings of floor, wall, and ceiling installation are made at small scale, outlets, devices, equipment, etc., are indicated only in their approximate location unless dimensioned. Locate outlets and apparatus symmetrically on floors, walls and ceilings where not dimensioned, and coordinate such locations with work of other trades to prevent interferences. Verify all dimensions on the job. Do not scale the electrical drawings but refer to the architectural and mechanical shop drawings and project drawings for dimensions as applicable.

C. Perform for other trades, the electrical wiring and connection for all devices, equipment, or apparatus. Consult Architectural, Mechanical, and other applicable drawings, and all applicable shop drawings to avoid switches, outlets, and other equipment from being hidden behind doors, cabinets, counters, heating equipment, etc. Relocate buried electrical devices and/or connections as directed at no additional cost.

D. All electrical networks, power, auxiliary, etc., systems shall be installed in conduit; see Section 260533.

E. Where conduit, outlets or apparatus are to be embedded in concrete, they shall be located and secured at the defined point. Check locations of the electrical items before and after concrete and/or masonry installation and relocate displaced items.

F. Provide block-outs, sleeves, demolition work, excavation, etc., required for installation of work specified in this Division. Opening shall be core drilled and/or saw cut and shall be no longer than required. Seal around conduit and on equipment inside and out with a silicone compound.

G. Roof Flashing: Where raceways penetrate roofing or similar area, provide 26 ga. galvanized iron roof jack, sized to fit tightly to raceway for weather tight seal, and with flange extending to a minimum of 9” under roofing on all sides. Coordinate all work with roofing contractor.

H. Patching and Repair
   1. The Contractor is responsible for all block-outs, demolition, patching and repair of all finished interior and exterior surfaces pertaining to the installation of this particular phase of work. All surfaces shall be finished (textured, painted, etc.) to match the adjacent materials.
   2. Hard Surfaces: Whenever demolition or excavation is required for the installation of the electrical system, it should be the responsibility of the Contractor to make repairs and/or replacements of hard finish surfaces such as concrete, asphalt, etc.
   3. Lawn replacement is also included as a part of this section.

4. The method of patching and repair should follow good construction practices. All surfaces shall match materials and finish wherein the demolition occurred when construction is complete.

I. All electrically powered equipment specified on this project, whether specified in the architectural, mechanical, or electrical specification, shall be electrically connected and made operational. Confirm voltage, amperage, and phases.

3.2 COMPLETION OF WORK AND TESTING

A. Before energizing any circuits, make megger ground tests on conductors, bus duct and fused disconnects with the distribution breakers open. These readings shall be recorded by circuit number identification and submitted in triplicate to the Owner's Representative before the system is energized.

B. Before final inspection, but after the electrical installation is complete, the Electrical Contractor shall remove neutral grounding connection from main distribution panel and demonstrate to authority having jurisdiction and Owner's Representative, with an ohmmeter, that the electrical system neutral is grounded through main panel location only. Neutral shall be reconnected after the test is complete.

C. Emergency Power System: In the presence of the Owner's Representative, test the emergency power system, in its entirety, by transferring from normal to emergency power no less than six times to prove proper operation of all equipment, devices, light fixtures, etc. that are powered by this system. If a power pack is used, the factory representative should be present during the test. Write a letter to the Owner's Representative confirming the conditions of this test.

D. Test Equipotential grounding system throughout the building and report the results.

E. Auxiliary Systems - 27 & 28 Each system defined in Contract Documents shall be made operational by the factory representative. The Factory Representative shall confirm the operation of each component (speaker, stand by power, etc.) and report in writing (triplicate) his confirmation of the systems status of operation.

3.3 FINAL REVIEW

A. At the time of final review, the project foreman shall accompany the reviewing party, and remove coverplates, panel covers and other access panels as requested, to allow review of the entire electrical system.

3.4 PROJECT FINALIZATION AND START-UP

A. Upon completion of equipment and system installation, notify equipment Factory Representative and Subcontractors for system start-up.

B. Each Factory Representative and Subcontractor shall assist in start-up to examine their respective system and remain at the site until the total system operation is accepted by the Owner's Representative.

C. The Factory Representative and/or System Subcontractor shall give personal instruction on operation and maintenance of their equipment to the Owner's maintenance and/or operation personnel. To certify acceptance of operation and instruction by the Owner's Representative, the contractor shall prepare a written statement as follows:
   1. This is to certify that the Factory Representative and/or System Subcontractor for each of the systems installed below have performed start-up and final check out of their respective systems is satisfactory.

D. This dated system operating report shall be submitted to the Owner's representative for distribution to the engineer and a copy placed in each maintenance manual.

a. Electrical Load Readings:

Demand_____kw	Panel D_____Amp
Panel A _____Amp	Panel E_____Amp
Panel B _____Amp	Panel F_____Amp
Panel C _____Amp	

etc. identify and record the load on each panel and motor loads ¾ hp and larger.

1. If there are any abnormal conditions, they shall be brought to the attention of the Engineer in writing as a part of this submittal.
2. Submit with the load readings for the motors, a list of motors with the size of overload heaters used for each motor. This includes thermal switches.
3. As a part of this document, submit a copy of each Auxiliary Systems test reports (Fire Alarm, etc.) with the proper signatures (See 3.2F).

System	Factory Representative
(List Systems Included)	(List name and address of Factory Representative)

4. The Owner's Representative has received complete and thorough instruction in the operation and maintenance of each system (See 3.4C).

_____ _____

Owner's Representative Contractor or Electrical Foreman

5. Report that each emergency luminaire has proven operational by killing the circuit and visually confirming the luminaire illuminates (See 3.2C).
6. The Owner's Representative has received and accepted all spare parts as heretofore required by contact (See 2.5).
7. Submit meggar OHM and equipotential test reports (See 3.2A and 3.2D).
8. Send copy of acceptance to Architect/Engineer.

END OF SECTION 26 0501

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SECTION 260508
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 MATERIALS AND METHODS

A. Materials and methods common to this project are listed below and shall be followed as closely as practicable using acceptable construction practices and specified products. This section indicates conditions and practices that should become a part of this project.
   1. Materials: The materials installed on this project shall be new, noted in this specification and shall be installed in the course of construction, except, they be changed in writing over the signature of the designer.
   2. Method: The method of installation shall follow current acceptable electrical practices under the direction of a licensed journeyman electrician. This will be further explained in the body of the specification.
   3. Notes: The notes on the plans are a part of the contract documents; a conflict between the specification and the drawings, the specifications rule.

1.2 EQUIPMENT CONNECTIONS

A. The Contractor shall install an electric service to the subject project as shown on the plans and described herein.

B. Extent of electrical connection for equipment <u>includes final electrical connection of all equipment (supplied under this or any other division or by the owner) having electrical requirements</u>. Make final connections for all owner furnished equipment. See other applicable Divisions of specification for building requirements, namely, mechanical, plumbing, temperature control wiring requirements, kitchen equipment, etc.

C. Refer to Division-23 sections for motor starters and controls furnished integrally with equipment.

D. Refer to Division-23 section for control system wiring; not work of this section, except as noted on the electrical plans.

E. Refer to sections of other Divisions for specific individual equipment power requirements.

1.3 QUALITY ASSURANCE

A. CODE COMPLIANCE: Comply with applicable portions of NEC, state, and local codes as to type products used and installation of electrical power connections.

B. UL LABELS: Provide electrical connection products and materials which have been UL-listed and labeled.

PART 2 PRODUCTS

2.1 GENERAL

A. For each electrical connection indicated, provide complete assembly of materials, including but not necessarily limited to; raceways, conductors, cords, cord caps, wiring devices, pressure connectors, terminals (lugs), electrical insulating tape, heat-shrinkable insulating tubing, cable ties, solderless wire nuts, and other items and accessories as needed to complete splices, terminations, and connections as required. See Section 260533, Conduit Raceways; Section 262726, Wiring Devices; and Section 260519 Conductors and Cables for additional requirements. Provide final connections for equipment consistent with the following:

1. Permanently installed fixed equipment - flexible seal-tight conduit from branch circuit terminal equipment, or raceway; to equipment, control cabinet, terminal junction box or wiring terminals. Totally enclose all wiring in raceway.
2. Movable and/or portable equipment - wiring device, cord cap, and multi-conductor cord suitable for the equipment and in accordance with NEC requirements (Article 400).
3. Other methods as required by National Electrical Code and/or as required by special equipment of field conditions.

END OF SECTION 260508

SECTION 260510
EXISTING FACILITIES AND EQUIPMENT

PART 1 GENERAL
1.1 DESCRIPTION OF WORK

A. Existing facility, whether standing alone or an addition to a standalone, or if the existing building is a part of a new facility, the bidder shall consider the existing unit a part of this project. All electrical equipment, panels, apparatus, luminaires, conduit/conductors, boxes, devices, etc., are to be removed, reworked, added to, extended, etc., as noted on the contract documents to make a complete and operable facility. The contractor shall also include in his bid an allowance to cover items that may be concealed in wall, ceiling, or floor, that must be rerouted, relocated, etc., to maintain or extend existing systems to keep them operable.

B. When the project is completed all systems, apparatus, etc., shall be made operable and left in normal operating order.

1.2 EXISTING EQUIPMENT

A. General: The electrical conditions in the existing facility are part of this project, and all costs, changes, extensions, additions, etc., pertaining thereto shall be included in the base bid.

B. Disconnect all equipment that obstructs and/or is to be relocated. Reconnect when reset.

C. The new electrical equipment and apparatus shall be coordinated and connected into the existing system as required. Auxiliary systems shall comply unless otherwise specified.

D. The new luminaires indicated for existing outlets shall be installed in accordance with the luminaire specifications. New Conductors shall be installed from the panel to each existing outlet.

E. Conduit and wire installed in existing structures shall be concealed. Exceptions shall be an approval of Architect. (See demolition and patching sections).

F. When conduit is to be installed below concrete, etc., the surface shall be cut, not ripped up, with a backhoe or other equipment, but shall be mechanically cut then removed.

G. All electrical equipment and apparatus in the building not remodeled shall be connected as per specifications and left in working conditions.

H. Existing raceways shall be used where possible, except as noted.

I. New conductors shall be installed throughout the project. This includes main and branch feeders and all branch circuit wiring in remodeled areas where changes and/or additions are being made.

J. All vacated or unused power, communication, signal, control wiring or cabling, etc., shall have wire pulled out of conduit back to branch panel or the first active outlet. The conductors/cabling become the property of the contractor and shall be removed from the site.

K. Any and all equipment having electrical systems (power, auxiliary, etc.) That require disconnecting and reconnection, at the same or another location throughout the course of construction, shall be included as part of this contract.

END OF SECTION 260510

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SECTION 26 0519
CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of electrical conductor and electrical cable work is indicated by drawings and schedules.

B. Types of conductors and cables in this section include the following:
   1. Copper Conductors (600V)

C. Applications for conductors and cables required for project include:
   1. Feeders
   2. Branch Circuits

1.2 QUALITY ASSURANCE

A. Comply with NEC as applicable to construction and installation of electrical conductors and cable. Comply with UL standards and provide electrical conductors and cables which have been UL-listed and labeled.

B. Comply with applicable portions of NEMA/Insulated Cable Engineers Association standards pertaining to materials, construction and testing of conductors and cable.

C. Comply with applicable portions of ANSI/ASTM and IEEE standards pertaining to construction of conductors and cable.

D. Non-approved materials.
   1. AFC Cabling
   2. Non-metallic sheathed cable.
   3. Service entrance cable.

1.3 SUBMITTALS

A. FIELD TEST DATA: Submit test data in accordance with IEEE Standard 400-1980 showing ambient conditions, voltage levels, level durations, and conduction current for each step. Include effective insulation resistance in submittal.

PART 2 PRODUCTS

2.1 COPPER CONDUCTORS (600V)

A. All conductors shall be copper with 90% conductivity.

B. Provide factory-fabricated conductors of sizes, ratings, materials, and types indicated for each service. Where not indicated provide.

C. Proper selection to comply with project's installation requirements and NEC standards. Provide conductors in accordance with the following:
   1. Distribution and Panelboard Feeders; and other conductors, #2 AWG and larger shall be Copper; see drawings for size.
   2. Conductors: All conductors shall be jacketed with THHN or XHHW insulation. Size all conductors in accordance with NEC; minimum size to be #12 AWG. Provide stranded conductors for #10 AWG and larger. Provide THHN insulated conductors (in dry areas) from outlets to luminaire, and in luminaire channels.
   3. Conductor ampacity shall comply when local codes have a derating factor because of ambient temperature.
   4. Provide color and coding of conductors as follows:
      a. Conductors
         1) All conductors shall be stranded copper wire, #12 AWG & #14 AWG may be solid copper. Color code all 208 volt wiring using black for phase A, red for phase B, blue for phase C, white for neutral and green for equipment ground.
         2) Color code all 480 volt brown for phase A, orange (purple) for phase B, yellow for phase C, gray for neutral, and green for equipment ground. A green ground shall be pulled in every conduit - see Grounding.
      b. Motor Control

1)	Motor Feeders	Black
2)	Hot or Stop Lead	Red
3)	Start Lead	Blue
4)	Common	White
5)	Indicating Light	Orange
6)	Interlock or Shunt	Brown
7)	Ground	Green

   5. Identify conductors on premise per NEC 210.5.

2.2 AUXILIARY CABLES

A. The contractor shall provide and install a cable from each auxiliary system as noted below (before ordering this cable, check the specific auxiliary system 270000-280000 for exact cables). The cables shall be as noted in the specification for each specific system.

2.3 CONNECTING BLOCKS (Also see Section 260520)

A. Taps made to conductors in wireways, switchgear, J-Boxes, etc. larger than #10 shall be made with an insulated connector. The connector block shall be an alloy that is completely compatible with copper, aluminum alloy 6061-T6 conductive plating for low contact resistance, excellent anti-pull out ability and set-screw for suring in place. The block shall be insulated with a molded high dielectric plastisol that will not support combustion, abrasive and chemical resistant. All connections shall comply with rated for 600 volt 90º C and comply with NEC 100. Torque each lug to the recommendations of the manufacturer.

B. The unit shall be NSI Series NSZ (in and out same side), other types are: Series IPL (double row), Series IT (in and out), Series IPLD (pass through), etc. The contractor shall decide which type of connection is best suited for installation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide #10 AWG conductors for all LED luminaire home runs.

B. Conductor size noted in panels is for the home run. The conductor may be changed to code size after the first apparatus.

C. "G" in the Conduit symbol, denotes a #10 (or larger) green ground, which shall be installed in the conduit with other conductors. It shall connect to the ground bar in the panel.

3.2 GENERAL:

Install electrical conductors and cables as indicated, in compliance with manufacturer`s written instructions, applicable requirements of NEC and NECA's "Standards of Installation", and in accordance with recognized industry practices.

A. Coordinate installation work with electrical raceway and equipment installation work, as necessary for proper interface.

B. Use pulling compound or lubricant, where necessary; compounds must not deteriorate conductor or insulation.

C. Keep conductor splices to minimum in a J-box.

D. Install splices and taps which have mechanical strength and insulation rating equivalent-or-better than conductor.

E. Use splice and tap connectors which are compatible with conductor material.

F. The conductor ends shall be stripped at the ends to comply with the following chart:

1. Strip Length Chart

CONNECTOR SIZE	LENGTH (inches)
500	2
350	1.75
250	1.625
3/0	1.437
1/0	1.25
#4	0.875

2. All conductor connections on lugs, breakers, connection blocks, etc. of the set-screw type shall be set with a torque wrench in strict accordance with industry standards as recommended for each conductor size.

3. Lug Torque Chart

CONN SIZE	500	350	250	3/0	1/0	#4
AWG/MCM WIRE SIZE	TIGHTENING TORQUE, INCH POUNDS					
500	375					
400	325					
350	325	325				
250	325	325	325			
4/0	325	325	325			
3/0	250	250	250	250		
2/0	180	180	180	180		
1/0	180	180	180	180	180	
3-2-1	150	150	150	150	150	
#4 - #6	110	110	110	110	110	45
#8	75	75	75	75	75	40
#10 - #16	75	75	75	75	75	35

G. **Vertical Support:** Conductors rising vertically shall be supported with conduit kellems grips or equal, in accordance with NEC section 300-19.

Cable Vertical Support Spacing	
Conductor Size	Minimum Distance - Feet
12 - 1/0	100
2/0 - 4/0	80
4/0 - 350 KCM	50
500 KCM	40

3.3 FIELD QUALITY CONTROL

A. Prior to energization, test cable and wire for continuity of circuitry, and also for short circuits. Correct malfunctions when detected.

B. Check and prove the proper phase rotation of all rotating equipment powered by this network.

C. Subsequent to wire and cable connections, energize circuitry and demonstrate functioning in accordance with requirements. (SEE SECTION ON COMPLETION AND TESTING)

END OF SECTION 26 0519

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SECTION 26 0520
ELECTRICAL WIRING CONNECTIONS

PART 1 GENERAL

The contractor shall make all electrical connections relating to the power, lighting, and auxiliary systems for this project. Each connection shall be made in such a manner that it will not generate heat and destroy the connecting and/or the insulation on the conductor. All connections shall be made in a skilled craftsman like manner.

1.1 DESCRIPTION OF WORK (STANDARD CONNECTIONS)

A. All connections shall be in compliance with the 75° NEC ratings.

B. The conductors being connected shall be cut of sufficient length to conveniently make a splice - minimum 6”.

C. Conductors No. 8 and smaller can be connected with a spring wire connector after the conductors have been mechanically twisted two (2) turns.

D. Conductors No. 6 and larger shall be connected with pressure type terminal lugs of a type hereafter noted.

E. All connections made shall be set in compliance with the lug torque chart in Section 260519.

F. All conductor connections No. 8 and smaller made below a point 24" above grade outside the building shall be made with a non-hardening sealant connector.

G. All conductor connections No. 6 and larger shall be made with water tight connectors.

1.2 PRODUCT DATA

A. Conductors No. 8 and Smaller: Free spring wire connectors made from flame retardant thermo plastic rated at 105°C (221°F), UL Standard 486, CSA LR6541. Cu/Cy, 600V Intgr. TSB, NSI.

B. Conductors No. 8 and smaller outside building (ground j-box, pole base, etc.) water tight steel spring connectors with water-proof non-hardening sealant, same rating as “A”.

C. Conductors No. 8 and Larger (dry locations): Insulated copper rated connectors with Allen wrench set-screw, such as NSI “IT” Series (size to conductors).

D. Multiple conductor connections No. 8 and Larger (dry locations: NSI Series IPL, IPLD, etc.

E. Insulated terminal strips up to 30 Amp, 600V shall be a double terminal block such as NSI Series “TB”, with appropriate mounting hardware.

F. Terminal blocks (size to conductors) such as Square “D” No. CBA363106.

PART 2 EXECUTION

2.1 GENERAL

A. All connectors shall be secure in place making a tight electrical connection.

2.2 FIXED EQUIPMENT

A. Terminal strips, terminal blocks shall be firmly secured in place.

END OF SECTION 26 0520

SECTION 26 0526
GROUNDING AND BONDING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Provide grounding as specified by NEC, as noted herein, and as indicated on drawings. Types of grounding in this section include the following:
   1. Service equipment
   2. Enclosures
   3. Systems
   4. Equipment
   5. Other items indicated on drawings.

B. "G" in the conduit symbol denotes a green ground (to match indicated conductor sizes) which shall be installed in the conduit with other conductors. It shall connect to an insulated ground bar in the panel. (Exception: Main Panel terminations made on ground bar bonded to enclosure).

C. “G” in all conduit, apparatus, equipment, etc. outside the building denotes a #10 bare ground interconnecting all outside equipment having an electrical connection.

D. A green ground conductor shall be installed in all non-metallic conduit runs.

E. Requirements of this section apply to electrical grounding work specified elsewhere in these specifications.

1.2 QUALITY ASSURANCE

A. Comply with NEC as applicable to electrical grounding and ground fault protection systems. Comply with applicable ANSI and IEEE requirements. Provide products which have been UL listed and labeled.

1.3 SUBMITTALS

A. None required.

PART 2 PRODUCTS

2.1 MATERIALS AND COMPONENTS

A. GENERAL: Except as otherwise indicated, provide each electrical grounding system as specified herein, and as shown on drawings, including but not necessarily limited to, cables/wires, connectors, terminals (solderless lugs), grounding rods/electrodes and plate electrodes, bonding jumper braid, and other items and accessories needed for complete installation.

B. Where materials or components are not otherwise indicated, comply with NEC, NEMA and established industry standards for applications indicated.

C. Install an insulated ground bar in branch panels.

2.2 ELECTRICAL GROUNDING CONDUCTORS

A. Unless otherwise indicated, provide electrical grounding conductors for grounding connections matching power supply wiring materials and sized according to NEC.

B. When conductor sizes are increased due to voltage drop (i.e., distance) the ground size shall be increased proportionately in size per NEC.

PART 3 EXECUTION

3.1 INSTALLATION OF GROUNDING SYSTEMS

A. Install electrical grounding systems in accordance with manufacturer's written instructions and with recognized industry practices to ensure grounding devices comply with requirements.

B. Install clamp-on connectors only. Thoroughly clean metallic contact surfaces, to ensure electrical conductivity and circuit integrity.

C. Provide grounding for the entire raceway, enclosure, equipment, and device system in accordance with NEC. All non-metallic raceways shall include copper grounding conductor sized in accordance with NEC.

D. See drawings for additional grounding requirements.

END OF SECTION 26 0526

SECTION 26 0529
CONCRETE PLATFORMS AND BASES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. This section relates to providing and installing concrete supports, bases, etc., as indicated for the service needed for the power conduits, panel bases, pole bases, service transformer pad, etc. as an electrical equipment.

B. All code conditions related here to shall be enforced.

C. Buried conducts shall be shrouded with “red” concrete and shall be placed on virgin and compacted fill to prevent settling. Conduit shall be grounded to allow conduit to drain to a low point. If the low point is at a vertical elbow drill a ½” (0.5”) diameter hole at the low point in the elbow to drain all water. At that point provide a 12x12x12 gravel bed to receive the water

D. When stated install encase service conduit in a red 5-bag mix concrete. The concrete shall shroud the conduit a minimum of 2” on all sides. Depth of conduit shall be 48" or as per code.

E. All service feeders shall be located by placing a plastic **High Voltage Ribbon** in the fill, 12” above (or as per code) the conduit run, for location at future excavation.

F. Provide and install concrete bases as noted on the planes.
   1. Concrete bases below panels shall be of the size noted on the plans, to raise the panel off the floor to eliminate water problems. The concrete shall be 5-bag mix with a finished to match the floor.
   2. All concrete bases (light poles, bollards, etc.) shall be of a type and size to carry the load installed thereon. The concrete shall be 5-bag mix with rebar as indicated. The base shall have a smooth hand rub sand finish.

1.2 EXECUTION

A. The installation of each system and/or parts and pieces shall follow good journeyman practices and code conditions.

END OF SECTION 26 0529

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SECTION 26 0533
RACEWAYS FOR ELECTRICAL SYSTEM

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of raceways in indicated by drawings and schedules.

B. Types of raceways in this section include the following:
   1. Electrical metallic tubing.
   2. Flexible metal conduit.
   3. Intermediate metal conduit.
   4. Liquid-Tight flexible metal conduit.
   5. Rigid metal conduit.
   6. Rigid non-metallic conduit. (below grade only w/RMC elbows)

C. Prohibited Raceway Materials:
   1. Aluminum conduit.
   2. Electrical Nonmetallic Tubing (ENT) conduit.
   3. Armored cable type AC (BX) cable.
   4. Metal-clad cable type MC cable.

D. Prohibited Fitting Materials:
   1. Crimp-on, tap-on, indenter type fittings.
   2. Cast set-screw fittings for EMT.
   3. Spray (aerosol) PVC cement.

1.2 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in the manufacture of raceway systems of types and sizes required, whose products have been in satisfactory use in similar service for not less than three (3) years.

B. Standards: Comply with applicable portions of NEMA standards pertaining to raceways. Comply with applicable portions of UL safety standards pertaining to electrical raceway systems; and provide products and components which have been UL-listed and labeled. Comply with NEC requirements as applicable to construction and installation of raceway systems.

C. Minimums: As a minimum, conduit sizes shall be as per NEC Tables 3A, 3B, and 3C or as shown on plans. Minimum conduit size shall be 3/4". Minimum home run size shall be ¾" . Electrical contractor shall not modify the wiring arrangement without prior approval from Engineer.

1.3 SUBMITTALS

A. Not required.

PART 2 PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. General: Provide metal conduit, tubing and fittings or types, grades, sizes and weights (wall thicknesses) as indicated; with minimum trade size of ¾".

B. **Auxiliary system conduit shall be installed as shown with 1 ¼" being the minimum size.**

C. Rigid Metal Conduit (RMC): FS WW-C-0581 and ANSI C80.1.

D. Intermediate Steel Conduit (IMC): RS 22-C-581.

E. PVC Externally Coated Rigid Steel Conduit: ANSI C08.1 and NEMA Std. Pub. No. RN1.

F. Rigid and Intermediate Steel Conduit Fittings: Provide fully threaded malleable steel couplings; raintight and concrete tight where required by application. Provide double locknuts and metal bushings at conduit terminations, us OZ Type B bushing on conduits 1¼" and larger.

G. Electrical Metallic Tubing (EMT): FS WW-C-563 and ANSI C80.3.
   1. Provide red EMT for fire alarm system (allied “Fire Alarm E-Z Pull” or equivalent)
   2. Provide Blue EMT for data, voice, video, and Security Systems (Allied “Blue EMT E-Z Pull” or equivalent).

H. EMT Fittings: Provide install set-screw type malleable steel fittings: connectors shall be insulated throat type, concrete tight where required by application. Install OZ Type B bushings on conduits 1¼" and larger.

I. Flexible Metal Conduit: FS WW-C-566, of the following type:
   1. Zinc-coated steel.

J. Flexible Metal Conduit Fittings: FS W-F-406, Type 1 Class 1, and Style A.

K. Liquid-Tight Flexible Metal Conduit: Provide liquid-tight, flexible metal conduit; constructed of single strip, flexible, continuous interlocked, and double-wrapped steel; galvanized inside and outside; coated with liquid-tight jacket of flexible polyvinyl chloride (PVC). Type UA and/or NMLT-B non-metallic.

L. Liquid-Tight Flexible Metal Conduit Fittings: FS W-F-406, Type 1, Class 3, Style G and/or fittings to match the specified non-metallic conduit noted above.

M. Expansion Fitting: OZ Type AX, or equivalent of suit application.

2.2 NON-METALLIC CONDUIT AND DUCTS

(Below grade only, shroud with concrete where indicated.)

A. General: Provide non-metallic conduit, ducts, and fittings of types, sizes and weights (wall thicknesses) as indicated shall not be installed inside the building, except it be encased in concrete and there it shall surface through a RMC elbow; with minimum trade size of ¾". (In this specification, it is not permitted above grade for any reason.)

B. Underground PVC Plastic Utilities Duct: ANSI/NEMA TC 6, Type 1 for encased burial in concrete, Type II for direct burial.
   1. PVC and ABS Plastic Utilities Duct Fittings: ANSI/NEMA TC9, match to duct type and material.
   2. Conduit, Tubing, and Duct Accessories: Provide conduit, tubing and duct accessories of types, sizes, and materials, complying with manufacturer's published product information, which mate and match conduit and tubing.

C. Sealing Bushings: Provide OZ Type FSK, or FSKA.

D. Special Ground: To maintain the building ground continuity, a NEC size ground shall be installed in each non-metallic conduit run, where the system voltage is greater than 48-volts.

PART 3 EXECUTION

3.1 INSTALLATION OF ELECTRICAL RACEWAYS

A. Install electrical raceways where indicated; in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA "Standard of Installation", and in accordance with the following.

B. Feeders Under 600 Volts: Install feeders to panels and motor control centers and individual equipment feeders rated 100 amps and greater, in rigid metal conduit (RMC), or intermediate metal conduit (IMC); except where buried below grade, install in non-metallic conduit or duct. Feeders 1½" round and larger shall be encased in concrete as a part of the floor. Not up in the floor, but just below the floor with the top of the conduit touching the bottom of the slab and the bottom of the conduit being covered with at least 1" of concrete.

C. Feeders below grade shall be installed in RMC and/or PVC conduit shrouded with a minimum of 3" cover of red concrete with a #3 rebar in opposite corners. The top of the duct bank shall be set 48” below finish grade.

D. Branch Circuits, Signal and Control Circuits, and Individual Equipment Circuits Rated Less Than 100 Amps: Install in electric metallic tubing (EMT); except in poured walls, floor slabs, below concrete slab-on-grade, or in earth fill, install in non-metallic plastic duct. Encase non-metallic plastic duct 1¼" and larger in concrete.

E. Coordinate with other work, including metal and concrete deck work, as necessary to interface installation of electrical raceways and components.

F. **When non-metallic conduit is used, it shall come to the surface in an RMC elbow or box.**

G. Coordinate the campus ground equipment installation with existing structures, trees, lawn sprinkler systems, etc.

H. Install raceway in accordance with the following:
   1. Provide a minimum of 12" clearance from flues, steam, and hot water piping, etc.
   2. Conceal raceways in finished walls, ceilings, and floors (other than slab-on-grade). Where conduit is exposed in mechanical spaces, etc., install parallel with or at right angles to building or room structural lines.
   3. Where cutting raceway is necessary, remove all inside and outside burrs; make cuts smooth and square with raceway.
   4. **Flexible raceways shall not be concealed in construction and where installed the run shall be limited to 10’ in length.**
   5. Comply with NEC for requirements for installation of pull boxes in long runs.
   6. All raceways shall terminate in a connection and/or bushing.

I. Install Fire Alarm Cable/Conductors above grade in red fire alarm conduit (See 2.1-G (1)).

J. Install data, and IP phone cables above grade in blue conduit (see 2.1-G (2)).

K. Secure conduit per NEC.

L. Install conduit in truss space per NEC.

3.2 NORMAL INSTALLATIONS

A. Cap open ends of conduits and protect other raceways as required against accumulation of dirt and debris. Pull a mandril and swab through all conduit before installing conductors. Install a 200 lb. nylon pull cord in each empty conduit run.

B. Replace all crushed, wrinkled, or deformed raceway before installing conductors.

C. Provide rigid metal conduit (RMC) for all bends in buried conduit greater than 30º. Provide a protective coating for RMC bend as specified herein.

D. Where raceways penetrate building or vault walls and floors below grade, install rigid metal conduit (RMC) for a minimum distance of 10' on the exterior side of the floor or wall. Provide OZ, Type FSK or WSK sealing bushings (with external membrane clamps as applicable) for all conduit penetrations entering building or vaults below grade.

E. Install liquid-tight flexible conduit for connection of motors, transformers, and other electrical equipment where subject to movement and vibration.

F. Install five spare ¾" conduit (capped) from each flush branch panelboard into the ceiling and floor space. Where the floor is not accessible run ten conduits into the ceiling space. Run conduits the required distance necessary to reach accessible ceiling space.

G. Provide OZ expansion fittings on all conduits crossing building expansion joints, both in slab and suspended.

H. Complete installation of electrical raceways before starting installation of cables/conductors within raceways.

I. All conduit that penetrates the roof shall be flashed with a factory jack, see Section 260501 - 3.1(G).

3.3 GROUNDING

A. All metal conduit terminations shall be equipped with a grounding bushing.

B. To maintain the continuity of the building ground network, install a code size ground conductor in all non-metallic conduit.

3.4 FIRE PENETRATION SEALS

A. All penetrations through fire rated floors and walls shall be sealed to prevent the spread of smoke, fire, toxic gas, or water through the penetration either before, during or after the fire. The fire rating of the penetration seal shall be at least that of the floor or wall into which it is installed so that the original fire rating of the floor or wall is maintained as required by Article 300-21 of the National Electrical Code. The sealant shall remain soft and pliable to allow for the removal and/or addition of cables without the necessity of drilling holes. It shall adhere to itself to allow any and all repairs to be made with the same material. It shall permit the vibration, expansion and/or contraction of raceways and/or cables going through the penetration without the seal cracking or crumbling.

B. When damming materials are to be left in place after the seal is complete, all such materials shall be non-flammable.

C. When sealant is injected into a penetration, the foam shall expand to surround all items within the penetration and maintain pressure against the walls of the penetration. The foam shall cure within five minutes and be fire resistant at that time. No heat shall be required to further expand the foam to block the passage of fire and smoke or water.

D. All wall or floor penetration opening shall be as small as possible.

E. The foam sealant shall meet all of the fire test and hose stream test requirements of ASTM E119-73 and shall be UL Classified as a Wall Opening Protective Device. The sealant shall be CHASE-FOAM CTC PR-585 Fire Resistant Foam Sealant from Chase Technology Corporation, Huntington Station, New York, 11746, or equals of 3-M and T &B.

F. Escutcheon plates - when a conduit passes through a ceiling, wall and/or floor into a finished space, an escutcheon plate shall be installed on the conduit to cover the unfinished hole and sealant.

G. See Details 12, 13, and 14/ED.03 for conduit and device installation.

3.5 PROHIBITED PROCEDURES

A. Use of wooden plugs inserted in concrete or masonry units for mounting raceway, supports, boxes, cabinets, or other equipment.

B. Installation of raceway which has been crushed or deformed.

C. Use of torches for bending PVC.

D. Spray applied PVC cement.

E. Boring holes in truss members.

F. Notching of structural members.

G. Supporting raceway from ceiling system support wires.

H. Nail drive straps for supporting raceway.

3.6 EXCAVATION AND BACKFILL

A. Raceway installation below slab-on-grade, or below grade:
   1. The Electrical contractor is responsible for all excavation and backfill related to the electrical installation defined herein and/or as indicated on the plans.

B. Underground raceway and conduit:
   1. Bury underground raceway installed outside building 24” deep minimum.
   2. Wrap buried galvanized rigid steel and galvanized IMC conduit and fittings with vinyl tape where in contact with earth or concrete.
   3. Opening of finished surfaces asphalt concrete, grass, etc. shall be accomplished by first identifying the limits of the opening then cut within the limits preserving the undisturbed areas. Asphalt shall be cut with a wedging tool, concrete with a diamond saw and grass with a cutter.
   4. Excavation shall be accomplished with the proper equipment; protective care shall be taken to not disturb the adjacent surfaces and materials. This contractor is responsible and shall protect all material objects and things adjacent to the excavation.
   5. All materials not reinstalled in the installation shall be removed from the premise.
   6. Backfill the first 6” layer over the installed subject (conduit, cable, etc.) shall be sand. Subsequent 6” layers shall be loan soil. Each layer shall be compacted to a 90% standard proctor test before the next layer is applied. (Refer to Section 260533, Part 3 for conduits required to be incased in concrete).
   7. For slab-on-grade construction, install runs or rigid plastic conduit (PVC) below slab. Install RMC (with protective coating) for raceways passing vertically through slabs on grade. Slope raceways as required to drain away from electrical enclosures and to avoid collection of moisture in raceway low points.

8. Apply protective coating to metallic raceways in direct contact with earth or fill of any type; consisting of spirally wrapped PVC tape (½" minimum overlap of scotch wrap tape or equal); or factory applied vinyl cladding (minimum thickness .020”). Completely wrap and tape all field joints.
9. Mark all buried conduits which do not require concrete encasement by placing yellow plastic marker tape (minimum 6" wide) along entire length of run 12" below final grade. Where multiple small lines are buried in a common trench and do not exceed an overall width of 16", install a single line marker.
10. Conduits encased in concrete shall be shrouded with a 3" of Red concrete. Install a #3 rebar in opposite corners of the encasement except for two conduits or less where two #3 bars in opposite corners is acceptable.

C. Raceway installation in suspended slabs:
1. Install conduit as close to the middle of concrete slab as practicable without disturbing reinforcement. Do not install conduits of diameter greater than 1¼" of the slab thickness. Space conduits not less than 3 diameters on center (except at stub up locations). Provide OZ expansion fittings at all expansion joints. All raceways shall be installed with concrete tight fittings.
2. Install RMC in all hazardous locations as defined by NEC. Provide suitable fittings, seal-offs, boxes, etc. to comply with requirements.

END OF SECTION 26 0533

SECTION 26 0534
BOXES, PULL BOXES, CONDUIT BODIES AND FITTINGS

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of electrical box and electrical fitting work is indicated by drawings and schedules.

B. Types of electrical boxes, fittings, etc. in this section, or noted on the plans shall include the following:
   1. Outlet boxes
   2. Junction boxes
   3. Conduit bodies
   4. Bushings
   5. Locknuts
   6. Knockout closures
   7. Miscellaneous boxes and fittings

1.2 QUALITY ASSURANCE

A. Comply with NEC as applicable to construction and installation of electrical boxes and fittings. Comply with ANSI C 134.1 (NEMA Standards Pub. No. OS 1) as applicable to sheet-steel outlet boxes, device boxes, covers and box supports. Provide electrical boxes and fittings which have been UL-listed and labeled.

B. Paint junction box covers (color coded by system) and install label describing system per Logan School District standard.

1.3 SUBMITTALS

A. None required.

PART 2 PRODUCTS

2.1 FABRICATED MATERIALS

A. Interior Outlet Boxes: Provide one piece, galvanized flat rolled sheet steel interior outlet wiring boxes, of types, shapes and sizes, including box depths, to suit each respective location and installation; construct with stamped knockouts in back and sides, and with threaded screw holes with corrosion-resistant screws for securing box covers and wiring devices; standard box shall be 4" square x 2-1/8" deep, (Raco 231) with ¾" knock outs and tile or **masonry/type** box extensions (Raco 843).

B. If the structure will not allow a 4 in² box use a 3" deep single gang unit (Raco 695).

C. In spaces with restricted width, like between a door frame and window jam, use partition boxes (Raco 426).

D. Interior Outlet Box Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, hangers, masonry extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used and fulfilling requirements of individual wiring applications. See the details on the plans.

E. Weatherproof Outlet Boxes: Provide corrosion-resistant cast-metal weatherproof outlet wiring boxes, of types, shapes, and sizes (including depth) required, with threaded conduit ends, cast-metal face application, with face plate gaskets and corrosion-resistant fasteners.

F. Junction and Pull Boxes: Provide code-gage sheet steel junction and pull boxes, with screw-on covers; of types, shapes and sizes to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers. J-box larger than 8 x 8 x 6 shall have a hinged cover.

G. Condulet Bodies (Fittings): Provide galvanized cast-metal conduit bodies, of types, shapes, and sizes to suit respective locations and installation, construct with threaded-conduit-entrance ends, removable covers, and corrosion-resistant screws.

I. Bushings, Knockout Closures and Locknuts: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and malleable iron conduit bushings and offset connectors, or types and sizes to suit respective uses and installation.

2.3 FITTINGS

A. The contractor shall provide **all sheet metallic** connectors, coupling, etc, a needed on this project.

B. When installing non-metallic sheathed cable, all connections to boxes, cabinets, etc., shall be made with screw steel fittings with a locknut connection to the box.

PART 3 EXECUTION

3.1 INSTALLATION

A. Interface with other work.

B. Coordinate location of outlet for water cooler with Division 22 & 23.

C. Coordinate location of outlets adjacent to or in millwork with Division 06 before rough-in. Refer conflicts to Architect and locate outlet under his direction.

D. Coordinate with Division 23 for installation of exposed raceway in mechanical equipment areas. Exact separation of responsibility is shown on Drawings.

E. Mount switch boxes with long dimension vertical.

F. **Mount receptacle boxes with long dimension vertical**.

G. Boxes shall be accessible and installed with approved cover.

H. Do not locate device boxes which are on opposite sides of framed walls in the same stud space. In other types of wall construction, do not install boxes back to back.

I. Locate boxes so outlets are not obstructed by pipes, ducts, or other items.

J. Install outlets flush with finished surface and level and plumb.

K. Boxes for switches shall generally be located within 6” of door jamb.

L. Properly center single outlets in each room. Where two or more outlets occur, space them uniformly and in straight lines with each other.

M. Support switch boxes larger than two-gang with side brackets and steel bar hangers in framed walls.

N. HVAC Instrumentation and Control System: Boxes installed by mechanical contractor.

O. Install electrical boxes and fittings where indicated, complying with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.

P. Minimum height of wall receptacles shall be 18". With the box arranged for vertical mounting of the receptacles (neutral slot at the left).

Q. Coordinate installation of electrical boxes and fittings with wire/cable and raceway installation work.

R. Provide coverplates for all boxes. See Section 260534, Wiring Devices.

S. Provide weatherproof outlets for interior and exterior locations exposed to weather or moisture.

T. Provide knockout closures or cap unused knockout holes where blanks have been removed.

U. Install boxes and conduit bodies to ensure ready accessibility of electrical wiring. Install recessed boxes with face of box or ring flush with adjacent surface so the device mounting flange sets on the box mounting plate. This will cause the device and coverplate surfaces to match.

V. Fasten boxes rigidly to substrates or structural surfaces to which attached, or solidly embed electrical boxes in concrete or masonry. Use bar hangers for stud construction. Use of nails for securing boxes is prohibited. Set boxes on opposite sides of common wall with minimum 10" of conduit between them.

W. Provide electrical connections for installed boxes.

END OF SECTION 26 0534

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SECTION 26 0548
ELECTRICAL SUPPORTS AND SEISMIC RESTRAINTS

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. All electrical equipment, distribution panels, motor control centers, conduit, device boxes, apparatus, etc., shall be securely anchored and/or supported in place as specified herein and/or in accordance with state, local, and seismic codes.
   1. Work of this section includes supports, anchors, sleeves, and seals required for a complete raceway support system, including but not limited to: clevis hangers, riser clamps, C-clamps, beam clamps, one and two hold conduit straps, offset conduit clamps, expansion anchors, toggle bolts, threaded rods, U-channel strut systems, and all associated accessories.
   2. Quality Assurance: Comply with NEC and local codes as applicable to construction and installation of electrical supporting devices. Comply with applicable requirements of ANSI/NEMA Std. Pub. No. FB 1, “Fittings and Supports for Conduit and Cable Assemblies”. Provide electrical components which are UL-listed and labeled.
   3. Manufactured Supporting Devices and Raceways: Provide manufactured mounting brackets (such as Caddy #SDG or SDB - D - 16); complying with manufacturer’s standard materials, design and construction in accordance with published product information, and as required for a complete installation; and as herein specified. See drawing details for additional requirements.
   4. Tie-wire is not acceptable.
   5. Supporting of equipment may be noted in other sections of the specifications.

B. Wall supported equipment shall be mounted on an angle support bracket with anchors into or through the wall as perimeter (the latter mounting is preferred, but must be approved by the architect), with two ½" rods up to the structure from the outer most corners of the mounting frame tied-off to the building structure. This would be likened unto a transformer. Wall mounted electrical panels shall be mounted directly to the wall.

C. For hanging of conduit, see Section 260533.

D. Installation of Supporting Devices for all types of Raceways: Install hangers, anchors, sleeves, and seals as required, in accordance with manufacturer's written instructions and with recognized industry practices to ensure supporting devices comply with requirements. Comply with requirements of NECA, NEC and ANSI/NEMA for installation of supporting devices.
   1. Coordinate with other electrical work, including raceway and wiring work, as necessary to interface installation of supporting devices with other work.
   2. Install hangers, supports, clamps and attachments to support piping properly from building structures. Arrange for grouping of parallel runs of horizontal conduits to be supported together on trapeze type hangers where possible.
   3. Raceways (All Types): Support raceways which are rigidly attached to structure at intervals not to exceed 8’ on center and within 12" of each junction box, outlet or fitting. Support raceway (as it is installed) in accordance with the following:

NUMBER OF RUNS	MIN. ¾" TO 1½"	1½" & LARGER
1	Full straps, clamps or hangers.	Hanger
2	Full straps, clamps or hangers.	Mounting Channel
3	Mounting Channel	Mounting Channel

4. Support suspended raceways on trapeze hanger system, or individually by means of threaded rod and straps, clamps, or hangers suitable for the application. Do not use "tie wire" as a portion of any raceway support system; do not support raceway from ceiling support wires.
5. Install electrical raceways where indicated; in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA "Standard of Installation", and in accordance with the following:
6. Coordinate with other work, including metal and concrete deck work, as necessary to interface installation of electrical raceways and components.
7. Coordinate the campus ground equipment installation with existing structures, trees, lawn sprinkler systems, etc.
8. Install raceway in accordance with the following:
   a. Provide a minimum of 12" clearance from flues, steam, and hot water piping, etc.

E. Floor Mounted Equipment: Provide rigid attachment of all floor mounted equipment to the floor slab or structural system. Provide 5/8" bolts or expansion anchors at each 90º corner and at intervals not to exceed 48" on center along entire perimeter of the equipment. Provide rigid attachment for all floor mounted switchboards, panelboards, power and control equipment, motor control centers, dimmer cabinets, transformers, oil switches, battery packs and racks, and similar equipment furnished under Section 26.

F. Buried Conduit: Conduit installed in the earth shall be laid on undisturbed soil and/or compacted fill. The first 6" of cover shall be sand. See Excavation and Backfill -see Section 260533-3.6.

G. Concrete slabs, bases, curbs, etc., for electrical apparatus shall be provided and installed under this contract. The concrete shall be 5-bag mix, except as noted.
   1. The contractor shall provide and install an 8 x 8 x 4 concrete base for the transformer (confirm size and depth with the service utility) at the indicated location.
   2. Unless otherwise noted, provide a 4" high concrete base for all main panels, motor control centers, transformers, engine generators, etc. Extend base 4" beyond equipment or mounting rails on all sides or as shown on the drawings. Coordinate the pad dimension with the equipment to be located thereon.
   3. Concrete pole bases (detailed on the plans) shall be provided under Division 26. Coordinate size and location of all bases and furnish all required anchor bolts, sleeves and templates as required to obtain a proper installation.
   4. All concrete used on this project shall be 5-bag mix and/or as specified in the concrete section of the Architectural Section.

PART 2 SEISMIC BRACING

2.1 GENERAL

A. The General Conditions, Supplementary General Conditions, Alternates and Addenda, Applicable Drawings and the Technical Specifications shall apply to all work under this division.

B. This seismic bracing section shall conform to the conditions governing the area within the structure being built under local and/or state UBC Seismic Requirements.

2.2 SCOPE OF WORK

A. The materials covered by these specifications consist of furnishing all labor, material, and equipment necessary to complete the seismic bracing for all work provided under section 260000.

B. The work shall include all electrical isolated and non-isolated equipment, luminaires, raceways, etc.

2.3 CODES - REGULATIONS

A. In the installation of this work, comply in every way with the requirements of the laws, ordinances and rules of the system design and installation shall be based on seismic zone III of the Uniform Building Code, current edition and other standards listed below.

B. Reference Standards:
   1. Uniform Building Code current edition, especially Sec. 2336
   2. NFPA bulletin 90A, current edition
   3. UL Standard 181
   4. Tri-services manual, fagel etal 1978

C. If a conflict occurs between these rules and this specification, the rules are to govern. Accept this condition upon submitting bid, and no extra charge will be allowed after the contract is awarded. This shall not be construed as relieving the contractor from complying with any requirements on the plans or specifications which may be in excess of requirements of the hereinbefore mentioned rules and not contrary to same. Contractor shall bear all costs arising from the installation of any materials or equipment which is in conflict with the above-mentioned codes or ordinances.

D. Obtain approvals, inspections, etc., required by code. All fees shall be included in the contract price. The contractor shall furnish a certificate of approval to the Owner's Representative from the inspection authority at completion of the work.

2.4 MATERIALS AND WORKMANSHIP

A. All materials and equipment furnished and installed shall be first quality, new and meet the standards of NEMA, IPCEA, LS, UL, NFPA, UBC, UOSH, NEC, and shall bear their label wherever standards have been established and label service is available. Where materials and equipment are specified by manufacturer's name, and type and quality required is thereby denoted. The Owner's Representative shall be afforded every facility, deemed necessary to inspect and examine the materials and apparatus being installed to provide their quality, skill and competency of workmanship.

B. Workmanship shall be the best quality of its kind for the respective industries, trades, crafts, and practices and shall be acceptable in every respect to the Owner's Representative. Nothing contained herein shall relieve the contractor from making good and perfect work in all details of construction.

C. The contractor shall work in harmony with the Owner's Representative and with other contractors, companies or individuals working in connection with this project. Imperfections or errors by other contractors shall not relieve responsibility of this contractor. Store materials orderly and clean up without interference.

2.5 QUALITY ASSURANCE

The contractor shall be held responsible for purchasing and installing vibrator isolators, flexible connections, rigid steel frames, concrete inertia bases, anchors, inserts, hangers, and attachments, seismic bracing and snubbers as required for seismic control and prevention of the transmission of vibration for both isolated and non-isolated systems.

A. Manufacturers and suppliers approved for use by the contractors Mason Industries, Inc., Korfund, and Amber/Booth Company.

B. The approved manufacturer or supplier shall be totally responsible for the fabrication and operation of the seismic bracing components specified herein for all isolated equipment, non-isolated equipment, luminaires, raceways, etc.

2.5 GUARANTEE

A. The entire electrical system installed under this contract shall be left in proper working order and be in compliance with the drawings, specifications and/or authorized changes to the satisfaction of the Owner's Representative. Without additional charge, replace any work or materials which develop defects, except from ordinary wear, within one year from the date of substantial completion. A written guarantee covering the above provisions shall be signed and delivered to the architect after the project has final acceptance by the inspecting authority.

PART 3 PRODUCTS

3.1 ISOLATED EQUIPMENT

A. All vibration isolated equipment shall be mounted on rigid steel frames or concrete bases. Each spring mounted base shall have a minimum of four all directional seismic snubbers that are double acting and located as close to the vibration isolators as possible to facilitate attachment both to the base and the structure. The snubbers shall consist of interlocking steel members restrained by shock absorbent rubber materials compounded to bridge bearing specifications.

B. Elastomeric, 50 durometer, materials shall be replaceable and a minimum of ¾" thick. Snubbers shall be manufactured with an air gap between hard and resilient materials of not less than 1/8" nor more than ¼". Snubbers shall be installed with factory set clearances.

C. The capacity of the seismic snubbers at 3/8" deflection shall be 3 to 4 times the load assigned to the mount grouping in its immediate area.

3.2 NON-ISOLATED EQUIPMENT, RACEWAYS, ETC.

A. All non-isolated equipment shall be installed according to current Uniform Building Code Sec. 2312 (g): Cp Factor Table 23J, I Factor Table 23K. In addition, the vertical forces, restraint requirements shall be computed as .5g the value of the lateral forces.

B. All non-isolated raceway shall be protected against seismic disturbances except as noted below:
   1. All electrical conduit less than 2" inside diameter.

PART 4 EXECUTION

4.1 SEISMIC REQUIREMENTS

A. All electrical work shall be braced, snubbed, or supported to withstand seismic disturbances and remain operational. Furnish all labor, materials, and equipment to provide protection against seismic disturbances and remain in place.

4.2 SHOP DRAWING SUBMITTAL AND REVIEW

A. Submit complete, bound submittal in a loose-leaf binder large enough for all items (8 copies) to architect after award of contract. All such submittals shall include, but are not necessarily limited to, the following:
   1. Complete engineering calculations and shop drawings, prepared and stamped by a licensed engineer (UBC 302-6) for all seismic requirements for all equipment that is to restrain raceways, etc.
   2. The type, size and deflection of each isolator proposed for items in this specification and on the drawings.

3. Details for all the isolators and seismic bracing with snubber proposed for items in this specification and on the drawings.
4. Details for steel frames and concrete inertia bases to be used in conjunction with the isolation of the items in this specification and drawings.
5. Clearly outlined procedures for installing and adjusting the isolators, seismic bracing, and snubbers.
6. The size, loading and location of raceway supports with either a plan or complete description of the system.

B. All items must be submitted at the same time. Partial submittals will not be accepted. Binders and indexes will remain in possession of engineer, architect, contractor, and sub-contractor.

C. Review is for assistance and interpreting the design concept. Changes in requirements will not be made in the review process. Review action does not exempt requirements to meet the intent of the contract documents. Any changes will be made by change order. Items not included in the submittal or incorrectly selected shall be in accordance with the contract requirements.

END OF SECTION 26 0548

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SECTION 26 0553
ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. The Electrical Contractor is responsible for the labeling of all electrical equipment for this project. The labels shall be made on 1/8” laminated micarta and an engraving machine as stated below.

B. Labeling and Engraving: Any and all electrical control equipment shall be labeled with an engraved black Micarta with white core labels, 1/16" thick, shall be bolted on the interior and the exterior of branch panels (panel name and voltage) and the exterior of disconnect switches, motor controls, major J-boxes (power and auxiliary), push buttons, thermal switches, time switches and similar equipment. The labels shall have ¼" high engraved letters, such as 1½ HP FAN, PANEL - A.

C. The phase of each feeder conductor shall be **color coded** at each end in panels and junction boxes as stated in Section 260519 - 2.1. The feeder powers shall be attached to the bundle of cables with a tie-wrap.

D. Conduit shall be installed as diagramed on the plan. Any deviation shall be authorized in writing prior to rough-in.

E. A plastic label, as noted above with the **name and address of the Engineer: Nielson Engineering, Inc., Pocatello, Idaho, Phone 208-232-2577** - the profession indicated - shall be bolted to the front of the Main Power Panel. The engraved letters in the name and address shall be ½" and ¼" high, respectively.

F. **Write with a felt tip pen that contains permanent ink, on the inside of each device box and on the back of every plate, the circuit to which the device is connected. Example: Circuit “A-1".**

G. Engraving device plates - see Wiring Devices.

END OF SECTION 26 0553

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SECTION 26 0800
COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 26, 27, and 28 Specification Sections, apply to this Section.

B. OPR and BoD documentation are included by reference for information only.

1.2 SUMMARY

A. This Section includes the following:
   1. General requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned.

B. The goal of the commissioning process for the commissioning is to verify for the Owner's Representative that the commissioned systems function interactively and in compliance with the design intent, and to facilitate the orderly and efficient transfer of the systems to the Owner.
   1. Commissioning is the process for achieving, verifying, and documenting that the performance of a building and its various systems, meet the design intent and the Owner's Representatives operational needs.
   2. Commissioning tests the operation of the equipment and building systems to ensure that they operate as designed and can satisfactorily meet the needs of the building throughout the entire range of operating conditions.
   3. Commissioning is a cooperative effort that requires participation by the Owner's Representative, Contractor, Installers, Engineer, Commissioning Agent, and Code Authority.

C. Test Procedures: Equipment test procedures of the specific manufacturer to be used in the commissioning process may be modified or expanded to accurately address equipment of the specific type used and manufacturer used for this project.

D. Commissioning is not intended to be a testing or inspection function that is a substitute for the Contractor's obligations for startup, system adjustment, testing, proof of performance, or contract closeout.

1.3 DEFINITIONS

A. BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

B. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

C. CxA: Commissioning Authority.

D. OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

E. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.4 COMMISSIONING TEAM

A. Members Appointed by Contractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project Superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.

B. Members Appointed by Owner:
   1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
   2. Representatives of the facility user and operation and maintenance personnel.
   3. Architect and engineering design professionals.

1.5 OWNER'S RESPONSIBILITIES

A. Provide the OPR documentation to the CxA and Contractor for information and use.

B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.

C. Provide the BoD documentation, prepared by Architect and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.6 CONTRACTOR'S RESPONSIBILITIES

A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

   1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
   2. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
   3. Attend commissioning team meetings to be held weekly.
   4. Integrate and coordinate commissioning process activities with construction schedule.
   5. Review and accept construction checklists provided by the CxA.
   6. Complete electronic construction checklists, as Work is completed, and provide to the Commissioning Authority weekly.
   7. Review and accept commissioning process test procedures provided by the Commissioning Authority.
   8. Complete commissioning process test procedures.

1.7 CxA'S RESPONSIBILITIES

A. Organize and lead the commissioning team.

B. Provide commissioning plan.

C. Convene commissioning team meetings.

D. Provide Project-specific construction checklists and commissioning process test procedures.

E. Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1% to 100%. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.

F. Prepare and maintain the Issues Log.

G. Prepare and maintain completed construction checklist log.

H. Witness systems, assemblies, equipment, and component startup.

I. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

1.8 SYSTEMS TO BE COMMISSIONED

A. Lighting Control (265110)
   1. Lighting Control Systems by Room

B. Integrated Electronic Communications Network (275100)
   1. Intercom System

C. Fire Alarm System (283123)
   1. Fire Alarm System

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION 26 0800

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SECTION 26 0923
LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. The Contractor shall provide and install the lighting controls as noted, which shall include the controls, accessories, boxes, etc., to make the installation complete and operable.

1.2 MOTION DETECTORS

A. The contractor shall provide and install adjustable timer (6-15 min.) motion detectors as noted on the plans. The detectors shall be complete with sensors, relays, (or power pack) enclosures, etc. for a complete installation.
   1. The small room wall detectors shall be of PIR technology. The unit shall cover a semi-circular area of 35' and shall be mounted 48" A.F.F. It shall be Watt Stopper WS-250-120/277 for 120 or 277-volts. Two-pole units shall be PW-200-W.
   2. The wall mounted detectors shall be a dual technology (PIR and ultrasonic) with an adjustable mounting bracket. The unit shall cover an area of 40' semi-circular area when set 9' A.F.F. The unit shall be such as a Watt Stopper DT- 200 with adjustable mounting bracket and power pack as needed.
   3. The ultrasonic detector shown in corridors is for controlling corridor luminaires. It shall have a 10' narrow beam for a range of 45' on either side of the center line or a range of 90' - see plan for layout. The unit shall be ceiling mounted (level with the bottom of any obstruction). It shall be Watt Stopper WT- 2255 with power pack. A power pack can serve up to 3 sensors.
   4. In lavatories, mount on the ceiling an advanced ultrasonic sensor that is omni-directional, Doppler technology. The unit shall control a power pack (double contact) that will control the luminaires and the exhaust fan. The unit shall be a Watt Stopper WT-1100. The detector shall provide a 28' x 44' coverage pattern.
   5. All detectors except small room detector (Item #1) require a power pack for power control. The contractor shall provide and install these components as a part of the contract. The power pack unit shall be Watt Stopper C120E-P or C277E-P (confirm voltage). Provide double-pole contact for motion sensors controlling exhaust fans. Install power pack in a J-box located in an accessible location. Note the final location of the power pack on the plans.

B. The detector shall have been tested and completed 60,000 successful operations.

C. Hubbell, Lutron, Leviton, Tork, or Sensor Switch are approved equals provided they meet the specifications and functions of the named units' criteria. If the substituted units do not perform all the functions, the contractor shall provide the named and/or specified equipment.

D. Submission: The contractor shall coordinate exact sensor location with manufacturer by submitting to the manufacturer a layout of the sensors for his review and evaluation. After the manufacturer has approved and endorsed the submitted plan, it shall be issued to the engineer as a shop drawing. The manufacturer shall provide the sensors as needed to perform the function and intents of the design.

1.3 LED DIMMER

A. Provide branch lighting solid-state AC dimmer controls for LED luminaires; wattage and voltage as indicated, 60 hertz, with 0-10V control. Provide dimmers manufactured by Lutron or as specified on drawings. Color as selected by Architect.

1.4 LED LIGHTING CONTROL SYSTEM

A. Provide an LED lighting control system when shown and specified on the plans. LED luminaire shall be equipped with a driver approved for the control system. Daylight sensors, occupancy sensors, low voltage switches, WIFI programming modules, etc., shall be commissioned as required by the International Energy Conservation Code.

B. The contractor shall operate the lamps for at least 100-hours before activating the dimmer equipment.

END OF SECTION 26 0923

SECTION 26 2416
PANELBOARDS

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of panelboard and enclosure work is indicted by drawings and schedules.

B. Types of panelboards and enclosures in this section include lighting and appliance panelboards, and power distribution panelboards.

1.2 QUALITY ASSURANCE

A. Provide units which have been UL listed and labeled. Comply with NEC as applicable to installation of panelboards, cabinets, and cutout boxes. Comply with NEC pertaining to installation of wiring and equipment in hazardous locations. Comply with NEMA Stds. Pub. No. 250, "Enclosures for Electrical Equipment (1000 volt maximum)". Pub. No. 1, "Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less".

1.3 SUBMITTALS

A. PRODUCT DATA
   1. Submit manufacturer data including specifications, installation instructions and general recommendations, for each type of panelboard required.

B. SHOP DRAWINGS
   1. Submit dimensioned drawings of panelboards and enclosures showing accurately scaled layouts of enclosures and required individual panelboard devices, including, but not necessarily limited to, circuit breakers, fusible switches, fuses, ground-fault circuit interrupters, and accessories.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products of one Square “D” Company - NQ, NF, or I-Line Type.

B. Approved Manufacturers
   1. Square “D” Company
   2. General Electric Company
   3. Siemons
   4. Eaton

2.2 PANELBOARDS

A. GENERAL
   1. Except as otherwise indicated, provide panelboards, enclosures, and auxiliary components, of types, sizes, and ratings indicated. Equip with number of unit panelboard devices as required for complete installation. Fully equip “spaces” with hardware to receive breaker or switch of size indicated.

2.3 LIGHTING AND APPLIANCE PANELBOARDS

A. Provide dead-front safety type lighting and appliance panelboards as indicated, with switching and protective devices in quantities, ratings, types, and arrangement shown, provide bolt-on thermal magnetic type branch breakers. Where multiple breakers are indicated, provide with common trip handle. Equip with aluminum bus bars full-sized neutral bus, ground bus and isolated ground bar when indicated.

2.4 PANELBOARD ENCLOSURES

A. Provide galvanized sheet steel cabinet type enclosures, in sizes and NEMA types as indicated, code-gauge minimum 16-gauge thickness. Provide fronts with adjustable indicating trim clamps, and doors with flush locks and keys, all panelboard enclosures keyed alike, with concealed door hinges and door swings as indicated. Equip with interior circuit-directory frame, and card with clear plastic covering. Provide baked gray enamel finish over a rust inhibitor. Provide enclosures fabricated by same manufacturer as overcurrent devices contained therein. Bolt engraved Formica labels indicating panel name and voltage on the interior and exterior of panelboards.

2.5 FINISH

A. Coat interior and exterior of surface with manufacturer's standard color; baked on enamel finish.

2.6 IDENTIFICATION

A. Provide 1/16" thick black Formica labels with ¼" high lettering on the interior and exterior of each panelboard; include panelboard name and voltage - see Section 260553.

2.7 BRANCH CIRCUIT BREAKERS

A. Provide and install branch circuit breakers of the size, type and amperage indicated, mounted in the position noted in the panel schedule.

The circuit breakers shall be as defined by NEMA as a device designed to carry electric current through a set of contacts and by automatic means open the contacts, interrupting the flow of current when the flow of current exceeds the labeled rating or on a high instantaneous inrush of current. The tripped breaker shall flag the interruption of the flow of current and be capable of being reset when returned to normal operating temperature. The breaker shall be a molded case unit that will open on an overload and/or short-circuit condition.

The unit shall be constructed as molded case units having a single handle operator for one, two or three pole units. For multiple pole units, and overload on any pole shall cause all terminals to open.

PART 3 EXECUTION

3.1 GENERAL

A. Install panelboards and enclosures where indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", in compliance with recognized industry practices to ensure products fulfill requirements.

B. Position the breakers in the panel to match the schedule on the plans.

C. Coordinate installation of panelboards and enclosures with cable and raceway installation work. Anchor enclosure firmly to walls and structural surfaces, ensuring they are permanently and mechanically secure. Arrange conductors neatly within enclosure, and secure with suitable nylon ties.

D. Fill out panelboard's circuit directory card upon completion of installation work. Utilize actual final building room numbers, not architectural numbers used on drawings. Identify individual lighting circuits and individual receptacle circuits by room served. Include room number with equipment circuit designations. All directories to by typewritten.

END OF SECTION 26 2416

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SECTION 26 2726
WIRING DEVICES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of wiring device work is indicated by drawings and schedules. Wiring devices are defined as a unit of an electrical system that carries or controls electric energy as its principal function.

B. Types of electrical wiring devices in this section include the following:
   1. Switches
   2. Receptacles
   3. Cord caps and connectors
   4. Low voltage switching
   5. Wiring device accessories

1.2 QUALITY ASSURANCE

A. Comply with NEC and NEMA standards as applicable for construction and installation of electrical wiring devices. Provide electrical wiring devices which have been UL listed and labeled.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's data on electrical wiring devices.

PART 2 PRODUCTS

2.1 FABRICATED WIRING DEVICES

A. GENERAL: Provide factory-fabricated wiring devices, in types, and electrical ratings for applications indicated and complying with NEMA Stds. Pub. No. WD 1. The devices shall be white with white coverplates.

B. Provide wiring devices (of proper voltage rating) as follows:

SWITCHES			(20A Continuous Rating)	
MFGR.	1-Pole	3-Way	4-Way	W-Pilot
Hubbell	DS120W	DS320W	DS420W	HBL1221PL
P&S	2621W	2623W	2624W	PS20AC1RPL(7)
Eaton	7622W-Box	7623W-Box	7624W-Box	AH1221PL
Bryant	9901W	9903W	9904W	4901PLR(*)

RECEPTACLES			(20A Continuous Rating)		
MFGR.	C.O.'s	GFI (Weather-Resistant)	Controlled	Hospital (Green Dot)	IG (Orange)
Hubbell	SNAP5362W A/SNAP2RA	GFR5362SGW	SNAP5362CIWA	HBL2182WA	IG 2162
P&S	5362-AW/Plugtail	2097TRWRAW	5362CHW	26362HGW	IG 26362
Eaton	AH5362W	TWRSGF20W	5362CHW	8362W	IG8362RN

C. Special devices as indicated on the plans, complete with matching coverplates shall be provided and installed where indicated.

D. All weatherproof covers on receptacles (GFI) and/or switches shall be mounted on a recessed box. Cover shall be made of cast aluminum such as Arlington Industries #DSHBIBRC. Equals of T&B and TayMac are acceptable. GFI receptacle shall be weather resistant as indicated in schedule above.

E. Provide devices in colors selected by Architect.

F. Contractor shall provide and install tamper resistant receptacles where required by NEC 406. If P & S/Eaton do not have tamper resistant version of specified device, provide Hubbell tamper resistant version where required.

2.2 CORDS CAPS AND CONNECTORS

A. Provide 3-wire grounding, cap plugs, and connectors of ampere and voltage rating required, for final equipment connection, and as indicated otherwise on drawings. Provide products of one of the following manufactures:
   1. Arrow Hart
   2. General Electric
   3. Hubbell
   4. Leviton
   5. Pass and Seymour
   6. Bryant

2.3 LOW VOLTAGE SWITCHING

A. Provide and install the equipment and materials necessary for the installation of low voltage switching network in the areas indicated on the plans. The low voltage conductors shall be installed in conduit in compliance with the specifications heretofore covered. The boxes and plates shall match the wiring device equipment heretofore covered.

B. All equipment shall be installed as per the manufacturer's instructions.

2.4 WIRING DEVICE ACCESSORIES

A. WALL PLATES: Provide and install high impact, smooth, white nylon coverplates for all wiring devices. Provide galvanized steel plates in unfinished or kitchen areas. Engrave all receptacle plates other than those serving 120 volt, single phase devices. State voltage and amperage characteristics. Example: "208V, 30A".

B. All switch banks shall have each switch identified as to its function with 1/8" thick laminated micarta engraved adhesive plate.

C. Weatherproof coverplates shall be Arlington Industries #DSHBIBRC. Equals of T & B and TayMac are acceptable.

PART 3 EXECUTION

3.1 GENERAL

A. Install wiring devices as indicated, in compliance with manufacturer's written instructions, applicable requirements of NEC, NECA's "Standard of Installation", and in accordance with recognized industry practices to fulfill project requirements.

B. Coordinate with other trades (including painting), the installation of electrical boxes and wiring. Install devices in boxes such that front of device is flush and square with coverplate. Drawings are small scale and, unless dimensioned, indicate approximate locations only of outlets, devices, equipment, etc. Locate outlets and apparatus symmetrically on floors, walls and ceilings where not dimensioned and coordinated with other work. Verify all dimensioned items on job site. Consult architectural cabinet, millwork, and equipment shop drawings prior to rough-in of electrical work.

C. Receptacles: **The receptacles shall be mounted vertically** with the neutral terminal or slot at the left side.

D. Install devices only in electrical boxes which are clean, free from excess building materials, dirt, and debris. Mark each box and the back of each device plate, with felt tip marker, indicating the circuit or port to which the device is connected. Example: "CKT A-1".

E. Install blank plates on all boxes without devices.

F. Delay installation of wiring devices until wiring work is completed. Delay installation of wall plates until after painting work is completed.

G. Do not Edison or share neutral conductors between phases.

3.2 PROTECTION OF WALL PLATES AND RECEPTACLES

A. At time of substantial completion, replace those items which have been damaged, including those stained, burned and scored.

3.3 GROUNDING

A. Provide electrical continuous, tight grounding connections for wiring devices, unless otherwise indicated.

3.4 TESTING

A. Prior to energizing circuitry, test with a hand test device that proves electrical connections: continuity, proper polarity, grounding, neutral connection, etc. Any irregularities shall be corrected.

END OF SECTION 26 2726

SECTION 26 2816
ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of motor and circuit disconnect switch and/or circuit breaker is indicated on the plans and schedules. Work includes complete installation and electrical connections.

1.2 QUALITY ASSURANCE

A. Provide motor and circuit disconnect switches, and/or circuit breaker (as noted), which have been UL listed and labeled. Comply with applicable requirements of NEMA Standards Pub. No. KS 1, and NEC.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's data including specification, installation instructions and general recommendations, for each type of motor and circuit disconnect switch required.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Subjects to compliance with requirements, provide products of one of the following (for each type of switch):
   1. Square D Company
   2. General Electric Co.
   3. Siemons
   4. Eaton Corp.

2.2 FABRICATED SWITCHES

A. GENERAL
   1. Provide heavy duty type disconnect and safety switches as indicated herein.
      a. Heavy duty switches on 240 and/or 600 volt rated circuits.
      b. HP rated switches on all motor circuits.

B. HEAVY DUTY SWITCHES
   1. Provide heavy-duty type, sheet-steel enclosed switches, fusible or non-fusible as indicated of types, sizes and electrical characteristics indicated; rated 240 and/or 600 volts, 60 hertz; incorporating spring assisted, quick-make, quick-break switches which are so constructed that switch blades are visible in OFF position with door open. Provide single phase or three phase with solid neutral as required by applications. Equip with an **interlocked operating handle** which is capable of being padlocked in OFF position. Provide NEMA 1 or NEMA 3R as required by application, unless noted. Provide fusible switches with Class R rejection fuse clip kits.

C. FUSES
   1. Where indicated, provide fuses for switches, as required of classes, types and ratings needed to fulfill electrical requirements for services indicated. Provide spare fuses amounting to one spare fuse for each 10 installed but not less than three of any one type and size. See Section 262813 for fuse types.

D. CIRCUIT BREAKERS
   1. Provide and install circuit breakers of the size noted on the plans. They shall be installed in a NEMA 1 enclosure unless otherwise noted.

PART 3 EXECUTION

3.1 INSTALLATION OF MOTOR AND CIRCUIT DISCONNECT SWITCHES

A. Install motor and circuit disconnect switches where indicated, complying with manufacturer's written instructions, applicable requirements of NEC, NECA's "Standard of Installation" and in accordance with recognized industry practices to ensure that products fulfill requirement.

B. Coordinate motor and circuit disconnect switch installation work with electrical raceway and cable work, as necessary for proper interface.

C. Install disconnect switches with motor drive appliances, and motors and controllers within sight of controller position.

END OF SECTION 26 2816

SECTION 26 2910
OVERCURRENT PROTECTIVE DEVICES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of overcurrent protective device work is indicted by drawings and schedules. Overcurrent protective devices specified herein are for installation as individual components in separate enclosures, and for installation as integral components of switchboards and panelboards. See Section 262413, Switchgear and Switchboards, and Section 262416, Panelboards.

B. Types of overcurrent protective devices in this section include the following for operation at 600 volts and above:
   1. Power circuit breakers

C. Refer to other Division-26 sections for cable/wire and connector work required in conjunction with overcurrent protective devices.

1.2 QUALITY ASSURANCE

A. Comply with NEC requirements and NEMA and ANSI standards as applicable to construction and installation of overcurrent protective devices.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's data on overcurrent protective devices, including catalog cuts, time-current trip characteristic curves, and mounting requirements.

B. Shop Drawings: Submit layout drawings of overcurrent protective devices, with layout of circuit breakers, including special relationships to proximate equipment.

C. Maintenance Stock, Fuses: For types and ratings required, furnish additional fuses, amounting to one unit for every 5 installed units, but not less than two units of each size and type.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER'S (LOW VOLTAGE)

A. Subject to compliance with requirements, provide products of one of the following (main and branch manufacturer must be same as panelboard and/or switchboard manufacturer):
   1. Circuit Breakers
      a. Square "D" Co.
      b. General Electric Co.
      c. Siemons
      d. Eaton Corp

PART 3 EXECUTION

3.1 INSTALLATION OF OVERCURRENT PROTECTIVE DEVICES

A. Install overcurrent protective devices as indicated, in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. Comply with NEC and NEMA standards for installation of overcurrent protective devices.

B. Coordinate with other work as necessary to interface installation of overcurrent protective devices with other work.

C. Provide a breaker coordination study. Set field-adjustable circuit breakers for trip settings recommended in study, subsequent to installation of devices.

D. Install fuses in overcurrent protective devices.

E. Field test all ground fault protective devices for proper operation; test to be performed by representative of the manufacturer. Include verification of complete time current trip characteristics.

3.2 FIELD QUALITY CONTROL

A. Prior to energization of overcurrent protective devices, test devices for continuity of circuitry and for short-circuits. Correct malfunctioning units and then demonstrate compliance with requirements.

END OF SECTION 26 2910

SECTION 26 5100
INTERIOR LIGHTING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of interior and exterior luminaire work is indicated by drawings and schedules.

B. The contractor shall provide the quantity of luminaires indicated on the plans. The drawn length (in standard increments) of the luminaire determines the quantity and the catalog number identifies the model or type. The catalog numbers have been carefully prepared to define the luminaire type but may not be completely accurate. At least four (4) days prior to bidding each manufacturer shall compare the catalog numbers shown with the description and requirements on the drawings and shall notify the Architect/Engineer of any discrepancies. Specifically included in the evaluation shall be the verifying of proper mounting kits or accessories to facilitate installation of the luminaire as shown at each location on the plans. No allowance or redress will be allowed for discrepancies that were not addressed to the indicated authorities for clarification prior to bidding. Reporting of ambiguities is the responsibility of the bidder.

C. On all pendant mounted luminaires, provide a second set of pendants, of a different length, as directed by the Architect/Engineer, to be used at their discretion. Provide and install at no additional charge to the project.

D. Types of light sources within the luminaires include the following:
   1. LED

1.2 QUALITY ASSURANCE

A. Comply with NEC (Article 410), NEMA and ANSI 132.1 as applicable to installation and construction of luminaires. Provide UL listed and labeled luminaires for installation on this project.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's data on interior and exterior building luminaires. Submit the manufacturer’s data on ballasts supplied with luminaires.

B. Shop Drawings: Submit dimensioned drawings of luminaires and supplied ballasts. Submit luminaire shop drawings with ballasts in booklet form with separate sheet for each luminaire, assembled in "type" alphabetical order, with proposed luminaire/accessories clearly indicated on each sheet.

C. Submit manufacturer’s contact information for future LED module/driver replacement by owner.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following (for each luminaire):
   1. LED lamps

2.2 INTERIOR LUMINAIRES

A. General: Provide luminaires, of sizes, types and ratings indicated. Luminaire shall be complete with, but not necessarily limited to, housings, lamps, lamp holders, reflectors, ballasts, starters and wiring. Label each luminaire with manufacturer's name and catalog number. Provide all enclosed luminaires with positive latch mechanisms, spring tension clips not acceptable. Provide all exterior luminaires with damp or wet location label as required by application.

B. Support Requirements: Provide all pendant and stem mounted luminaires with flexible ball joint hangers at all points of support. Equipment hooks used to hang luminaires shall be supplied with safety latches. Provide all detachable luminaire parts, luminous ceiling accessories, louvers, diffusers, lenses, and reflectors with locking catches, screws, safety chain or safety cable.

   Each hanger point shall be capable of supporting four times the luminaire weight. Backing supports shall be installed above (or behind) sheetrock, plaster and similar ceiling and wall materials. All surface mounted ceiling luminaires shall be supported from a structural channel. See plans for additional details.

2.3 LED DRIVERS/LAMPS

A. 5-year warranty; lamps (4000-4500K). See additional information on Sheet E2.0.

PART 3 EXECUTION

3.1 INSTALLATION OF LUMINAIRES

A. Install luminaires at locations and heights indicated, in accordance with luminaire manufacturer's written instructions, applicable requirements of NEC (Article 410), NECA's "Standard of Installation", NEMA standards, and with recognized industry practices to ensure that luminaires fulfill requirements.

B. Coordinate with other work as appropriate to properly interface installation of luminaires. Consult architectural reflected ceiling plan for exact location of all luminaires.

C. Provide all necessary supports, brackets, and miscellaneous equipment for mounting of luminaires. Support all ceiling mounted luminaires from the building structure; independent of the ceiling system, unless noted. Support each recessed luminaire from the building structure with #12 ga. steel wire attached to each luminaire corner (in addition to supports normally provided for attachment to the ceiling system). Provide backing supports above (or behind) sheetrock, plaster and similar ceiling and wall materials. Support ceiling mounted outlet boxes independent of the raceway system, and capable of supporting 200 pounds. See plans for additional details.

D. Install emergency battery inside luminaire ballast channel with charging indicator light and test switch mounted on fixture end, or visible and accessible through lens. Wire so luminaire can be tested with lights on and lamps in normal mode are switched off with other lighting in area. Connect emergency battery to unswitched conductor.

E. Clean luminaires of dirt and debris upon completion of installation.

F. Protect installed luminaires from damage during remainder of construction period. Repair all nicks and scratches to appearance of original finish. If repair is not possible, replace damaged portion of luminaire.

3.2 FIELD QUALITY CONTROL

A. Upon complete installation of luminaires, and after building circuitry has been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning luminaires on site, then reset to demonstrate compliance; otherwise remove and replace with new luminaires and proceed with retesting.

B. At the time of Substantial Completion, replace lamps in interior luminaires which are observed to be noticeably dimmed after the Contractor's use and testing, as judged by Architect/Engineer. In addition, furnish replacement lamps amounting to 15% (but not less than one lamp) of each type and size used (Max. 48 of any one type). Deliver replacement stock with letter of transmittal as directed to Owner's storage space.

C. Luminaires shall be aimed in accordance with a manufacturer’s field layout for maximum uniform coverage of the field.

D. Provide tight equipment grounding connections for each luminaire.

END OF SECTION 26 5100

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SECTION 26 5200
EMERGENCY LIGHTING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Furnish and install emergency batteries as described in Contract Documents at the designated locations.

B. The batteries shall be of the type, size, voltage, and wattage as noted on the drawings.

C. All fixtures noted with "**B**" in type number as well as others indicated by keynote #1 shall be circuited directly to a non-switched power source.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. Batteries
   1. General
      a. Batteries shall be long life nickel cadmium type.
      b. Complete with charging indicator light and test switch.
      c. Factory-installed in luminaire, or capable of being field-installed to same standards.
   2. Standard Linear Luminaires
      a. Shall operate one luminaire at approximately 1400 lumens for 90 minutes.
      b. Battery shall be capable of full recharge in 24 hours.
   3. Recessed Downlight Luminaires
      a. Shall operate lamp(s) of luminaire for 90 minutes minimum.
      b. Components shall be easily accessible for maintenance.

PART 3 EXECUTION

3.1 INSTALLATION

A. Emergency Batteries
   1. General
      a. Wire so luminaire can be tested with lights on.
      b. Wire so lamps in normal mode are switched off with other luminaires in area. Connect unit to unswitched conductor of normal lighting circuit.
   2. Recessed Downlight Luminaires: If indicator light and test switch cannot be installed within fixture, install on plate adjacent to luminaire.
   3. Other Luminaires: Install batteries in driver channel of luminaire with charging indicator light and test switch mounted on luminaire end, or visible and accessible through lens.

END OF SECTION 26 5200

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DIVISION 27-28
SOUND REINFORCING, COMMUNICATIONS, AUDIO-VIDEO, DATA AND SECURITY SYSTEMS

No.	Section	No. of Pages
270000	**COMMUNICATIONS AND DATA**	
270000-80000	DATA, TELEPHONE, AUDIO-VIDEO SOUND SYSTEMS, SECURITY, FIRE ALARM AND DETECTION	2
270001-280001	COMMON CONDUIT AND VACANCY SYSTEMS FOR COMMUNICATIONS	1
270500	TELEPHONE CONDUIT AND BOXES	1
270510	TELEPHONE EQUIPMENT AND CABLING SYSTEM	1
271000	DATA CONDUIT AND BOXES (CONDUIT ONLY)	1
275123	BUILDING INTERCOM SYSTEM EXPANSION	2
281000	**ELECTRONIC ACCESS CONTROL AND INTRUSION DETECTION**	
281000A	ELECTRONIC ACCESS CONTROL	1
28300	**DETECTION AND ALARM**	
283123	FIRE ALARM SYSTEM EXPANSION	8

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SECTIONS 27 0000-28 0000
DATA, TELEPHONE, AUDIO-VIDEO, SOUND SYSTEMS, SECURITY, FIRE ALARM AND DETECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

B. Section 260501 Common Electrical Requirements apply to work in this section.

C. Division-23 for location of equipment.

D. Section 260533 “Raceways for Electrical Systems” apply to work in this section.

1.2 SCOPE OF WORK

A. The Auxiliary Systems of this specification are sections that have numbers greater than 270000 and 280000. This specification will include the Auxiliary Sections that are relative to this project. (See Section 260000 for listing). The materials, equipment, apparatus, etc. noted in Division 26 relates directly to these sections and to be worked hand in hand with the components named in either or both. Examples: Conduit, Device boxes, support, etc. may be named in either or both specifications.

B. Each system mentioned herein is a complete system. Each network is a new system, an extension of an existing and/or a new system that incorporates an existing system into the new. Whatever the condition, the contractor shall provide all the equipment, materials, labor, etc. for a complete and operable network. Each system is specified to perform a definite function. The function and operation of a system is the final objective and whatever the requirement to accomplish that objective shall be included. If for any reason the specifications do not complete the network, the bidder and/or manufacturer’s representative shall call the deficiencies to the attention of the engineer by facsimile five (5) days prior to the bid date, so they can be included in an addendum. Failure to submit this information to the attention of the engineer does not relieve the bidder from supplying and installing the equipment needed for a complete and operable system.

C. Walk through the system when the project is complete and **each auxiliary system** shall be tested and set into operation.

D. The contractor, the owner's and manufacturer's representative shall test each component of each system, except for the Fire Alarm System where the local fire chief shall also witness the test, for normal operation. When the test is complete, the outcome of the test shall be reported in writing to the architect and engineer that the system meets all the conditions and functions of the specifications for normal operation. Each person in the test party shall place his signature on the report.

E. Example: In the case of the Fire Detection and Alarm System, the people mentioned above plus the local Fire Marshall (or his representative) shall check out the Fire Alarm System. Each component (break glass station, heat detector, ionization detector, alarms, etc.) shall be tested individually to prove their function in the total system. Any and all defective components shall be repaired and/or replaced.

F. Each of the other auxiliary systems, one by one (sound, F.A., telephone, computer, etc.) shall be tested and written reports made on the results of the test, as stated above with copies sent to the engineer and placed in each maintenance manual.

G. The factory representative shall review with the operator and administrator on their use of the equipment making sure the equipment is used to the ultimate.

H. As heretofore mentioned in this specification each auxiliary system carries a one year warranty from the date of acceptance by the owner.

END OF SECTION 27 0000-28 0000

SECTIONS 27 0001-28 0001
COMMON CONDUIT AND VACANCY SYSTEMS FOR COMMUNICATIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The contractor shall provide and install all the conduit for the communication systems shown on the plans and/or as stated herein.

B. The conduit shall be ¾" Dia. Minimum size of the type noted in Section 260533.

C. The device boxes of the size and type need for proper installation if the cabling system shall be of the type noted in section 26.

D. The conduit shall be supported as stated in section 260548.

E. For wireway, cable trays, hooks, etc. systems as noted on the plans refer to section 260536 for product type and installation. Support as directed.

1.2 DESCRIPTION OF WORK

A. After the conduit has been installed as directed install cables and/or conductors as noted on the plans.

B. All conduits installed without conductors and/or cables, shall have pulled there in a nylon cord installed between all pull boxes plus 24” on each end for use in installing cables at a later time.

END OF SECTION 27 0001-28 0001

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SECTION 27 0500
TELEPHONE CONDUIT AND BOXES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Provide and install all the conduit, boxes, fittings, supports, etc. required for the system. See section 260533-2.1-G (2) for telephone conduit requirements.

B. The extent of the telephone system is to provide and install conduit from the point of service to the indicated outlets. Terminate the conduits in a standard device box, set at the indicated location and height. When complete install a nylon pull cord in the conduit for use of the cable installers.

C. Refer to the section 260533 and 260534 for requirements for conduit, fittings, device boxes, cover plates, etc. as applicable. The conduit installation shall comply with Section 260533 with supports as indicated.

D. Empty conduits shall include a nylon pull cord with a 24” pigtail at each end.

E. The owner shall provide and install the telephone system.

END OF SECTION 27 0500

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SECTION 27 0510
TELEPHONE EQUIPMENT AND CABLING SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

B. Section 260501 “Common Electrical Requirements” applies to work in this section.

C. Section 270500 “Telephone Conduit and Boxes” applies to work in this section.

1.2 SCOPE

A. The contractor shall provide and install a complete telephone system: switch, cable, service arresters, instruments, jacks, cover plates, etc., for a complete and operable system as stated herein and shown on the plans.

B. Extent of telephone system work is indicated by drawings and is herein defined to include, but not be limited to raceway outlets, device plates, backboards, cabinets, grounding, and miscellaneous items required for complete raceway system.

C. The General Provision of the contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section, as well as all codes and standards referenced.

1.3 QUALITY ASSURANCE

A. Comply with applicable portions of NEC as to type of products used and installation of components. Provide products and materials which have been UL-listed and labeled.

PART 2 PRODUCTS

2.1 GENERAL

A. Provide complete raceway system for telephone including but not limited to, raceway, outlets, device plates, backboards, cabinets, grounding, and miscellaneous items as required.

B. Provide terminal cabinets of code gauge steel, flush or surface, as indicated, with concealed trim clamps, concealed hinges, and flush lock, with gray backed enamel finish to match finish of panelboard covers. Construct back boxes of code gauge galvanized steel with removable end walls.

PART 3 EXECUTION

3.1 INSTALLATION OF TELEPHONE RACEWAY SYSTEM

A. GENERAL: Install raceway system as indicated to comply with NEC and recognized industry practices. Run ¾" conduit from each telephone outlet to terminal backboard, tray, or terminal cabinet. Provide nylon pull cord in all installed raceway.

END OF SECTION 27 0510

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SECTION 27 1000
DATA CONDUIT AND BOXES (CONDUIT ONLY)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

B. Section 260501 “Common Electrical Requirements” applies to work in this section.

C. Section 260533 “Raceways for Electrical Systems” applies to work in this section.

1.2 DESCRIPTION OF WORK

A. Provide and install all the conduit, boxes, fittings, support etc. required for this system. See section 260533 - 2.1 - G (2) for data conduit requirements.

B. Install conduit as required, 1¼" minimum size, for the installation of a computer system as per the drawings. The equipment shall be by others. Coordinate rough-in with the equipment supplier.

C. Where computer conduit is indicated for cabinet mounting, refer to the detail on the drawings. EMT conduit, boxes, fitting, etc. shall be fabricated and installed in the cabinet. The height shall be below the countertop and the plugs made accessible through holes in the counter top.

D. The owner shall provide and install the computer system.

E. Raceways, Hangers, etc.

END OF SECTION 27 1000

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SECTION 27 5123
BUILDING INTERCOM SYSTEM EXPANSION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. The conditions of the General Contract (General, Supplementary, and other Conditions) and the General Requirements are hereby made a part of this Section.

B. All bids shall be based on the existing Telecor system equipment.

C. The contractor for this work shall be held to have read all of the bidding requirements, the general requirements of division 1, and contract proposal forms, and the execution of this work. The contractor will be bound by all of the conditions and requirements therein.

D. The contractor shall be responsible for providing all equipment and material for a complete functional system including all necessary components whether included in this specification or not.

E. In preparing the bid, the contractor should consider that no claim will be made against the owner for any costs incurred by the contractor for any equipment demonstrations (which the owner requests) to prove the system.

1.2 SCOPE OF WORK

A. Furnish and install all equipment, accessories, and materials in accordance with these specifications and drawings to provide all devices and equipment for this remodel.

B. System may operate from a telephone system when connected to analog CO trunks.

1.3 SUBMITTALS

A. Specification Sheets shall be submitted on all items including cable types.

B. Submit outline drawing of system control cabinet showing relative position of all major components.

C. Shop drawings, detailing integrated electronic communications network system including, but not limited to, the following:
   1. Station wiring arrangement
   2. Equipment cabinet detail drawing

D. Submit wiring diagrams showing typical connections for all equipment.

1.4 QUALITY ASSURANCE

A. All items of equipment shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.

B. The contractor shall be an established communications and electronics contractor that has had and currently maintains a locally run and operated business for at least 5 years. The contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges.

C. The contractor shall show satisfactory evidence, upon request, that he or she maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The contractor shall maintain at his or her facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

END OF SECTION 27 5123

SECTION 28 1000
ACCESS CONTROL EXPANSION

PART 1 GENERAL

1.1 MANUFACTURER & PRODUCT

A. Manufacturer of card reader equipment shall be level (#52).

B. Contractor to provide card reader controller and card readers to match existing equipment at site as shown on plan.

1.2 GENERAL REQUIREMENTS

A. Furnish and install a complete access control system with the performance criteria detailed in this specification. The system shall be inclusive of all necessary functions, monitoring, and control capability as detailed herein and on accompanying shop drawings.

1.3 SUBMITTALS

A. Shop Drawings: Shop drawings shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES, and shall consist of a complete list of equipment and materials, including manufacturer's descriptive and technical literature, performance charts and curves, catalog cuts, and installation instructions.

B. Spare Parts Data: After approval of the shop drawings, and not later than one month prior to the date of beneficial occupancy, a list of spare parts data for each item of specified materials and equipment shall be submitted. The data shall include a complete list of parts and supplies with current unit prices and source of supply. All spare parts shall be on site prior to commencement of acceptance testing. Depleted spare parts shall be replaced prior to beneficial occupancy.

C. Operating and Maintenance Instructions:
   1. Operating Instructions: The Contractor shall furnish to the Architect six copies of operating instructions outlining the step-by-step procedures required for system start-up, operations, and shutdown at least 30 days prior to acceptance test. The instructions shall include the manufacturer's name, system model number, service manual, parts list, and brief description of all equipment and their basic operating features.
   2. Maintenance Instructions: The contractor shall furnish six complete copies of maintenance instructions listing routine maintenance procedures, possible breakdowns, and repairs, and troubleshooting guides at least 30 days prior to acceptance test. The instructions shall include simplified diagrams for the systems as installed.
   3. Performance Test Reports: Upon Completion and testing of the installed system, test reports shall be submitted in booklet form showing all field tests performed to prove compliance with specified performance criteria. Each test report shall indicate the final position or readings of calibrating controls.

PART 2 INSTALLATION

2.1 INSTALLATION

A. Materials shall be installed in strict compliance with local building codes.

B. Dedicated 120v power shall be installed for access control equipment.

END OF SECTION 28 1000

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SECTION 28 3123
FIRE DETECTION AND ALARM SYSTEM EXPANSION

PART 1 GENERAL

A. The contractor shall provide and install materials and labor to remodel existing notifier Fire Alarm system in this facility as specified herein and shown on the plans. The system shall be complete, operable, and receive acceptance (in writing) from the governing authority. Contact Pye Barker (Chad Carrigan) for quote. They have the district contract for fire alarm work.

B. The installation includes all the conduit, boxes, fittings, etc. as required for a complete and operable system.

PART 2 PRODUCTS

2.1. FIRE ALARM SYSTEM SEQUENCE OF OPERATION

A. The system shall identify any off normal condition and log each condition into the system database as an event.
   1. The system shall automatically display on the control panel Liquid Crystal Display the first event of the highest priority by type. The priorities and types shall be alarm, supervisory, trouble, and monitor.
   2. The system shall have a Queue operation and shall not require event acknowledgment by the system operator. The system shall have a labeled color-coded indicator for each type of event; alarm-red, supervisory - yellow, trouble-yellow, monitor - green which shall turn on when active events exist.
   3. For each event, the display shall include the current time, the total number of events, the type of event, the time the event occurred and up to a 40-character custom user description.
   4. The user shall be able to silence the local signal and review each event by simply selecting scrolling keys (up-down) for each event type.
   5. New supervisory or trouble events shall sound a silence-able signal at the control panel.

B. Operation of any Alarm initiating device shall automatically:
   1. Update the control/display as described above (A.1).
   2. Sound all alarm signals throughout the building at the evacuation rate.
   3. Turn on all strobe lights throughout the building.
   4. Turn on a red alarm zone LED at the fire alarm control panel.
   5. Operate the alarm relay contacts to initiate the transmission of an alarm to a central station agency via telephone dialer or on leased telephone lines.
   6. Operate addressable control relay contacts to shut down all HVAC units serving floor of alarm.
   7. Operate control relay contacts to return all elevators that serve the floor of alarm initiation to the ground floor. If the alarm originates from the ground floor, operate control circuits contacts to return all elevators to the floor above or to a level as directed by the local fire department.
   8. Operate control relay contacts to release all magnetically held smoke doors throughout the building.
   9. Visually annunciate the zone of alarm on the remote annunciator panel. The visual indication shall remain on until the alarm condition is reset to normal.
   10. Activate voice annunciation in required spaces based on occupancy.

C. Activation of a sprinkler supervisory initiating device shall:
   1. Update the control/display as described above and turn on the trouble relay.
   2. Turn on a yellow zone LED at the fire alarm control panel.
   3. Operate the supervisory relay contacts to initiate the transmission of an alarm to a central station agency via leased telephone lines.

4. Visually annunciate the zone of alarm on the remote annunciator panel. The visual indication shall remain on until the alarm condition is reset to normal.

D. The entire fire alarm system wiring shall be electrically supervised to automatically detect and report trouble conditions to the fire alarm control panel. Any opens, grounds or disarrangement of system wiring and shorts across alarm bell/strobe wiring shall automatically.
   1. Update the control/display as described above (B.1).
   2. Operate the supervisory relay contracts to initiate the transmission of an alarm to a central station agency via leased telephone lines.
   3. Visually and audibly annunciate a general trouble condition, on the remote annunciator panel. The visual indication shall remain on until the trouble condition is repaired.

E. Support for Installer and Owner Maintenance
   1. Provide a coded one man walk test feature. Allow audible or silent testing. Signal alarms and troubles during test. Allow receipt of alarms and programmed operations for alarms from areas not under test.
   2. Provide internal system diagnostics and maintenance user interface controls to display/report the power, communication, and general status of specific panel components, detectors, and modules.
   3. Provide loop controller diagnostics to identify common alarm, trouble, ground fault, Class A fault, and map faults. Map faults include wire changes, device type changes by location, device additions/deletions and conventional open, short, and ground conditions. Ground faults on the circuit wiring of remote module shall be identified by device address.
   4. Allow the user to display/report the condition of addressable analog detectors. Include device address, device type, percent obscuration, and maintenance indicator. The maintenance indicator shall provide the user with a measure of contamination of a device upon which cleaning decisions can confidently be made.
   5. Allow the user to report history for alarm, supervisory, monitor, trouble, smoke verification, and restore activity. Include Facility Name, Licensee, Project Program Compilation date, Compiler Version, Project Revision Number, and the time and date of the History Report.
   6. Allow the user to disable/enable devices, zones, actions, timers, and sequences. Protect the disable function with a password.
   7. Allow the user to activate/restore outputs, actions, and sequences.
   8. Allow the service user to enter time and date, reconfigure an external port for download programming, initiate auto programming and change passwords. Protect these functions with a password.

F. Materials:
   1. Fire Alarm Control Panel:
      a. The fire alarm control panels shall be Edwards Systems Technology (EST) type EST2 series and shall incorporate all control electronics, relays, and necessary modules and components in a semi-flush mounted cabinet. The operating controls and zone/supervisory indicators shall be located behind locked door with viewing window. All control modules shall be labeled, and all zone locations shall be identified. The cabinet shall be steel, with a gray finish. The assembly shall contain a base panel, system power supply and battery charger with optional modules suitable to meet the requirements of these specifications.
         Manufacturers: This specification has been written around Edwards Systems Technology, which establishes a standard.
      b. System circuits shall be configured as follow: Addressable analog loops Class A; Notification Appliance Circuits Class A.
      c. Single stage operation.

d. The system shall be supervised, site programmable, and of modular design with expansion modules to serve up to 192 detectors and 188 remote modules, and multiple notification appliance circuits (NACs) convertible to power risers to serve remote multiple NAC modules for zoned signal applications. The system shall be expandable to a minimum of 960 detectors and 940 remote modules.
e. The system shall store all basic system functionality and job specific data in non-volatile memory. The system shall survive a complete power failure intact.
f. The system shall have built-in automatic system programming to automatically address and map all system devices and provide a minimum default single stage alarm system operation with support of alarm silence, trouble silence, drill, lamp test, and reset common controls.
g. The system shall allow downloading of a job specific custom program created by system application software. It shall support programming of any input point to any output point. The system shall support the use of Bar Code readers to assist custom programming functions. It shall allow authorized customization of fundamental system operations using initiating events to start actions, timers, sequences, and logical algorithms.
h. The system shall support distributed processor intelligent detectors with the following operational attributes; integral multiple differential sensors, automatic device mapping, electronic addressing, environmental compensation, pre-alarm, dirty detector identification, automatic day/night sensitivity adjustment, dual normal/alarm LEDs, relay bases, and isolator bases.
i. The system shall use full digital communications to supervise all addressable loop devices for placement, correct location, and operation. It shall allow swapping of “same type” devices without the need of addressing and impose the “location” parameters on replacement device. It shall initiate and maintain a trouble if a device is added to a loop and clear the trouble when the new device is mapped and defined into the system.
j. The system shall have a U.L. Listed Detector Sensitivity test feature, which will be a function of the smoke detectors and performed automatically every 4 hours.
k. The system shall support 100% of all remote devices in alarm and provide support for a 100% compliment of detector isolator bases.
l. All panel modules shall be supervised for placement and return trouble if damaged or removed.
m. The system shall have a CPU watchdog circuit to initiate trouble should the CPU fail.
n. The system evacuation signal rate shall be March time at 120 PPM.
o. Provide a signal silence inhibit feature set to enter integer time between 0-99 minutes and an automatic signal silence timer set to enter integer time between 0-99 minutes. Audible notification appliances shall be affected by signal silence features. Visual signal appliance shall not be affected by signal silence features.
p. The system program shall meet the requirements of this project, current codes, and standards, and satisfy the local Authority having Jurisdiction.
q. Passwords shall protect any changes to system operations.
r. The power supply shall be a high efficiency switch mode type with line monitoring to automatically switch to batteries for power failure or brown out conditions. The automatic battery charger shall have low battery discharge protection. All outputs shall be power limited. The battery shall be sized to support the system for 24 hours of supervisory and trouble signal current plus general alarm for 5 minutes.

s. The LCD Display Module shall be membrane style construction with a 4 line by 20-character Liquid Crystal Display. The LCD shall use supertwist technology and backlighting for high contrast visual clarity. In the normal mode display the time, the total number of active events and the total number of disable points. In the alarm mode display space for user custom messages. The module shall have visual indicators for the following common control functions; AC Power, alarm, supervisory, monitor, trouble, disable, ground fault, cpu fail, and test. There shall be common control keys and visual indicators for; reset, alarm, silence, trouble silence, drill, and one custom programmable key/indicator. Provide four pairs of display control keys for selection of event display by type (alarm, supervisory, monitor and trouble) and forward/backward scrolling through event listings. The operation of these keys shall be integrated with the related common control indicators to flash the indicators when undisplayed events are available for display and turn on steady when all events have been displayed. Allow the first event of the highest priority to capture the LCD for display so that arriving fire fighters can view the first alarm event “hands free”. Provide system function keys; status, reports, enable, disable, activate, restore, program, and test. The module shall have a numeric keypad, zero through nine with delete and enter keys.

t. The Main Controller Module shall control and monitor all local or remote peripherals. It shall support the LCD Display Module, power supply, remote LCD and zone display annunciators, strip and carriage printers, and support communication interface standard protocol (CSI) devices such as color computer annunciators and color graphic displays. The RS-485 port shall be capable of supporting up to 32 remote annunciators. The MCM shall provide one loop controller circuit, two notification appliance circuits, and common form ‘C’ contacts for alarm, supervisory, and trouble. Contact ratings shall be 1 Amp at 24Vdc.

u. The panel shall have:
   1) A march time module for signal rate control to provide 20 spm, 120 spm, or temporal 3-3-3 signal patterns.
   2) An interface module for remote site monitoring. The module shall have a local energy municipal look and reverse polarity connections for each of alarm, supervisory and trouble.

v. The Fire Alarm Contractor shall provide and install a laminated 1/16" building plan in a frame at the main Fire Alarm Panel and the Annunciator Panel showing the building zones. The plan shall have a red LED light therein indicating that will illuminate when an alarm is activated in that zone. The lamp will remain illuminated until the alarm has been cleared.

w. The system shall support and relate to an Annunciator Panel all the functions that are pertinent to a fireman as he visits the Annunciator Panel on a fire alarm. The panel shall be located at the designated entrance and shall be electrically called thereto.

2.2. SIGNATURE SERIES INTELLIGENT ADDRESSABLE ANALOG DEVICES

A. General, All Devices
   1. Furnish and install where indicated on the plans.
   2. Each remote device shall have a microprocessor with non-volatile memory to support its functionality and serviceability. Each device shall store as required for its functionality the following data: device serial number, device address, device type, personality code, date of manufacture, hours in use, number of alarms and troubles, time and date of last alarm, amount of environmental compensation left/used, last maintenance date, job/project number, current detector sensitivity values, diagnostic information (trouble codes) and algorithms required to process sensor data and perform communications with the loop controller.

3. Dependent on its functionally each device shall be capable of monitoring up to 32 diagnostic codes. This data shall be stored at the device and available for system maintenance.
4. Each device shall be capable of performing its intended function independent of the control panel to lower loop data traffic. Each device shall immediately alert the loop controller of a status change to achieve a loop response time of less than 500 ms.
5. Each device shall be capable of performing its intended function independent of the control panel to lower loop data traffic. Each device shall immediately alert the loop controller of a status change to achieve a loop response time of less than 500 ms.
6. The operating environment shall be restricted to a temperature of 32º F to 100º F, humidity: 0-93% RH, non-condensing.

B. Detector Devices General
1. Each detector shall continually monitor the environmental impact of temperature, humidity, barometric pressure and air-born contaminates. The process shall adapt the detector to long term environmental changes and signal the loop controller when the detector approaches 50% and 100% of the allowable environmental compensation value.
2. Differential sensing algorithms shall maintain a constant sensitivity setting between the alarm threshold and a compensated base line sensitivity setting between the alarm threshold and a compensated base line sensitivity. The base line sensitivity shall be updated approximately once every hour.
3. Each detector shall have a separate means of displaying communication and alarm status. A green LED shall flash to confirm communication. A red LED shall flash to display alarm status. LEDs shall be visible through a full 360º viewing angle.
4. Each detector shall be capable of transmitting pre-alarm and alarm signals.
5. Each detector shall be suitable for mounting on Signature Series detector mounting base.
6. All detectors shall be suitable for wall mount applications.

C. Sensor Devices
1. Each detector sensor shall use differential sensing to provide accurate data to the detector's alarm algorithm processor. The fire decision algorithm shall combine all sensor analog signal dimensions and time to increase reliability and distinguish real fire conditions from unwanted deceptive nuisance alarms. The detector shall respond faster to fire signal patterns affecting more than one sensor. Signal patterns not typical of fires shall be eliminated. Devices not capable of combining different fire parameters shall not be acceptable.
2. Sensor devices shall be:
   a. SIGA-PS Intelligent Photo Detector shall use a light scattering type photo sensor. The detector shall be suitable for area protection and direct insertion into air ducts up to 3' high and 3' wide with air velocities up to 5000'/min. without requiring specific duct detector housings or supply tubes. The detector shall have a UL Smoke Sensitivity Range 0.67 - 3.77% Obscuration/ft. The detector shall be rated for ceiling installation at a minimum of 30' centers.
   b. Single Sensor Devices shall be:
      1) SIGA-HRS Fixed Temperature/Rate-of-Rise Heat Detector shall have a low mass thermistor and operate at a nominal fixed temperature of 135º F and at a temperature rise at or exceeding 15º F per minute. It shall have a minimum linear space rating of 70' centers.
      2) SIGA-HFS Intelligent Fixed Temperature Heat Detector shall have a low mass thermistor and operate at a fixed temperature of 135º F. It shall have a minimum linear space rating of 70' centers.

D. Detector Bases
   1. Detector bases shall mount to North American 1 gang, 3½" or 4" octagon boxes, and a 4 in² box. Removal of the respective detector shall not affect communications with other detectors. Terminal connections shall be made on the room side of the base. All detectors shall be compatible with any base.
      a. The SIGA-SB and SIGA-SB4 standard bases shall provide terminals to connect a SIGA-LED Remote Alarm Indicator.
      b. The SIGA-RB and SIGA-RB4 relay bases shall have a bi-stable relay with form 'C' contacts rated at 30 Vdc at 1.0A, supervised for position and tested on power up. The relay shall be controlled by its respective detector processor and in the event of a communication failure the operation of the relay shall not be affected. Upon removal of the detector the relay shall automatically de-energized.
      c. The SIGA-IB and SIGA-IB4 Isolator Base shall be controlled by its respective detector processor and operate within 23 msec. Of a short circuit condition on the data lines. An active isolator base shall continue to test for the short condition and automatically return to normal should the fault condition clear.

E. Duct Detectors
   1. SIGA-DH Duct Detector Enclosure shall an assembly suitable for mounting a Signature Series Detector into a duct.

F. Modules General
   1. It shall be possible to change the personality or function of a device.
   2. All modules shall be gang mounted and complete with the necessary mounting hardware, cover plates, and end-of-line devices.
   3. Input wiring shall be supervised for opens and grounds.
   4. Output wiring shall be supervised for opens, shorts, and grounds.
   5. Each module shall have a minimum of 2 diagnostic LEDs. A green LED shall flash to confirm communications. A red LED shall flash to confirm active status.
   6. SIGA-CT1 Single Input Module shall be of single gang construction and programmable.
   7. SIGA-CT2 Dual Input Module shall be of single gang construction and each circuit shall be independently programmable.
   8. SIGA-WTM Waterflow/Supervisory Input Module shall be of single gang construction and have two factory programmed circuits. Circuit one shall have personality code 2 (delayed waterflow) and circuit two shall have personality code 4 (latching supervisory).
   9. SIGA-CC1 Single Input Signal Module shall be of two gang construction and have one signal riser input and one supervised Class 'B' output circuit rated a 24Vdc 2A or 50W. Programmed with personality code 5 it shall be capable of operating 24 Vdc polarized signals, or 25V or 70V speaker appliances.
   10. SIGA-CC2 Dual Input Signal Module shall have two gang construction and provide two signal riser inputs and one Class 'B' supervised output circuit rated a 24Vdc 2A or 50W. It shall be capable of selecting one of two inputs (alert/page or evacuation) for operating 24 Vdc polarized signals, or 25V or 70V speaker appliances.
   11. SIGA-CR Control Relay Module shall have single gang construction and provide one form 'C' dry relay contact rated 24Vdc at 2 amps. To control external appliances or equipment shutdown.
   12. SIGA-UM Universal Class A/B Module shall have two gang construction and shall be configurable for a single riser input with a single output, single or dual inputs, or as a control relay. It shall be programmable.
   13. SIGA-278 Intelligent Double Action Fire Alarm Station shall be of single gang construction and provide double action, single stage, non-coded, break glass operation. The fire alarm station shall be of lexan construction with an internal toggle switch. Provide a keyed locked test feature. Finish the station in red with white "LIFT THEN PULL HANDLE" and "PULL FOR FIRE" lettering.

2.3 FIRE ALARM NOTIFICATION APPLIANCES

A. General Notification Appliances
   1. All appliances shall be U.L. Listed for Fire Protective Services.
   2. All strobe appliances or combination appliances with strobes shall be capable of providing the "Equivalent Facilitation" which is allowed under the Americans with Disabilities Act Access abilities Guidelines (ADA(AG)), and shall be UL 1971, UL 1638, and ULC S526 Listed.

B. Furnish and install where shown on the plans:
   1. Horns shall be manufactured by EST, Cat. No. 757 Series. In-Out Screw terminals shall be provided for wiring. A sound output level of 103 dBA Peak shall be provided.
   2. Horn/Strobes shall be manufactured by EST, Cat. No. 757 Series. They shall provide synchronized flash strobe output, and 100 dBA Peak sound output level from the horn. Provide strobe outputs as indicated on drawing.
   3. Mini-Horn/Strobes shall be manufactured by EST, Cat. No. 692 Series. They shall provide strobe output, and 91 dBA Peak sound level output from the horn. Provide strobe outputs as indicated on drawing.
   4. Strobes shall be manufactured by EST, Cat. No. 202 Series. They shall provide synchronized flash output. Provide strobe outputs as indicated on drawing.

2.4 ANCILLARY DEVICES

A. Furnish and install where shown on the plans.
   1. Furnish and install magnetic door holders, EST Cat. No. 1500 Series, for flush wall mounting as shown on the plans. The housings and contact plates shall have a brushed zinc finish. All units shall have a holding of force of approximately 25 lb. ft.

B. Acceptable Manufacturers:
   1. The catalog numbers used are those of Edwards Systems Technology (EST), and constitute the type and quality of equipment to be furnished.
   2. Approved Bidders:
      -Auto-Call, Gamewell and Notifier.
      -Other manufactures/bidders must submit products for approval at least 10 working days prior to bid date. Approved suppliers shall be required to meet all requirements of the specification.

PART 3 EXECUTION

A. INSTALLATION

1. The entire system shall be installed in a workmanlike manner, in accordance with approved manufacturer's wiring diagram. The contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets, and similar devices necessary for the complete installation. All wiring shall be of the type recommended by the manufacturer, approved by the local Fire Department, and shall be installed in red EMT conduit throughout. (Section 260533 - 2.1 - G (2))
2. All penetration of floor slabs and fire walls shall be fire stopped in accordance with all local fire codes.
3. End of Line Resistors: Shall be furnished as required for mounting as directed by the manufacturer.
4. All wiring shall be color coded throughout, to National Electrical Code standards.
5. The system shall be arranged to receive power from one three wire 120 VAC, 15 A supply. All low voltage operation shall be provided from the fire alarm control panel.
6. Field Quality Control: The system shall be installed and fully tested under the supervision of a trained manufacturer's representative. The system shall be demonstrated to perform all of the function as specified.

B. Tests
   1. Reports of any field-testing during installation shall be forwarded to the Engineer in writing.
   2. In the presence of the code enforcing authority, each individual component in the system shall be tested for operation on a circuit-by-circuit basis shall be tested for its complete operation. The procedure for testing the entire fire alarm system shall be set forth with the consent of the code enforcement official, the contractor, the school official, and the manufacturer representative. When complete, a statement of approval shall be written and signed by each of the testing parties, confirming acceptance shall be sent to the engineer, owner, and general contractor.

C. Documentation and Training
   1. The contractor shall compile and provide to the owners three (3) complete manual on the completed system to include operating and maintenance instruction, catalog cuts of all equipment and components, as-built wiring diagrams and a manufacturer's suggested spare parts list.
   2. In addition to the above manuals, the contractor shall provide the services of the manufacturer's trained representative for a period of four (4) hours to instruct the owners designated personnel on the operation and maintenance of the entire system. An EST2 End-User Training Video shall be included as part of the system documentation.

END OF SECTION 28 3123

SECTION 32 3113
CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Posts, rails, and frames.

B. Wire fabric.

C. Concrete.

D. Manual gates with related hardware.

E. Accessories.

1.02 REFERENCE STANDARDS

A. ACI 301 - Specifications for Concrete Construction; 2020.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

D. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric; 2011a (Reapproved 2022).

E. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2023.

F. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.

G. ASTM F567 - Standard Practice for Installation of Chain-Link Fence; 2023.

H. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework; 2018 (Reapproved 2022).

I. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures; 2018 (Reapproved 2022).

J. CLFMI CLF-PM0610 - Product Manual; 2017.

K. CLFMI CLF-SFR0111 - Security Fencing Recommendations; 2014.

1.03 SUBMITTALS

A. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

B. Shop Drawings: Show locations, details, materials, dimensions, sizes, weights, finishes, operational clearances, and installation of components. See CLFMI CLF-SFR0111 for planning and design recommendations.

PART 2 PRODUCTS

2.01 MATERIALS

A. Posts, Rails, and Frames: Comply with the following:

1. Line, Terminal, Corner, Rail, Brace, and Gate Posts: Type I round.
   a. Type I Round: LG 40 or Schedule 40 galvanized steel pipe complying with ASTM F1083. Comply with ASTM F1043, Material Design Group IA, external and internal coating Type A, consisting of not less than 1.8-oz./sq. ft. zinc; and line, end, corner, and pull posts and top rail per requirements.
   b. Post Brace Rails: Match top rail for coating and strength and stiffness requirements. Provide brace rail with truss rod assembly for each gate, end, and pull post. Provide two brace rails extending in opposing directions, each with truss rod assembly for each corner post and for pull posts. Provide rail ends and clamps for attaching rails to posts.
2. Comply with CLFMI CLF-PM0610.

B. Wire Fabric: Comply with CLFMI's "Product Manual" :
   1. Nine gauge core, minimum wall thickness of .015 inches over a galvanized substrate. The base metal shall have a minimum breaking strength of five hundred fifty pounds (550 lbs.) and a zinc coat weight of .1503 pounds per square foot of un-coated wire surface. Top and bottom selvage of the fabric shall be knuckled.
   2. ASTM A392 zinc coated applied to steel wire mesh fabric after weaving with Class 1. 1.2-oz./sq. ft. minimum coating weight.
   3. The tensioning strands shall consist of one-half inch (1/2”) diameter, 7-wire, stress relieved strands, having a guaranteed ultimate tensile strength of 270,000 psi (270 kips). Strands shall conform to astm-416. Cables shall be fabricated to proper length for each slab, coated with a permanent rust preventative lubricant and encased in slip-age sheathing and shall be repaired with tape prior to concrete placement as necessary. A maximum of six inches (6”) exposed strands is permitted at the dead-end anchor.
   4. Comply with CLFMI CLF-PM0610.

C. Cast-in-Place Concrete: Normal-weight concrete air entrained with not less than 3,000-psi compressive strength (28 days), 3-inch slump, and 1-inch maximum size aggregate:
   1. Cast-in-Place concrete complying with ACI 301.
   2. Materials consisting of Portland Cement complying with ASTM C150/C150M.
   3. Aggregates complying with ASTM C33/C33M.
   4. Potable water.

2.02 COMPONENTS

A. Line Posts: 1.9 inch diameter spaced at 8 feet.

B. Corner and Terminal Posts: 2.38 inch diameter.

C. Gate Posts: 3-1/2 inch diameter.

D. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled. Swedged-end or fabricated for expansion-type coupling.

E. Gate Frame: 1.66 inch diameter for welded fabrication.

F. Fabric: 2 inch diamond mesh interwoven wire, 7 guage thick, top selvage knuckle end closed, bottom selvage knuckle end closed.

G. Tension Wire: 7 guage thick steel, single strand, metallic-coated. Match coating and color on chain link fence fabric.

H. Tie Wire: Aluminum alloy steel wire.

2.03 MANUAL GATES AND RELATED HARDWARE

A. Comply with ASTM F900 for single gates, made from galvanized steel pipe and tubing complying with ASTM F1043, complete with hardware.
   1. Hardware for Single Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches high, 3 for taller gates; fork latch with gravity drop and padlock hasp.
   2. Frames and Bracing: For gate fabric height 6 feet or less with welded corners.
   3. Gate Posts: Fabricate members from round galvanized steel pipe for the following gate fabric heights by leaf widths: 6 feet or less by 4 feet or less.

B. Hinges: Finished to match fence components.
   1. Brackets: Round.
   2. Mounting: Center.
   3. Closing: Manual.

C. Latches: Finished to match fence components.
   1. Brackets: Round.

2.04 ACCESSORIES

A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.

2.05 FINISHES

A. Components (Other than Fabric): Galvanized in accordance with ASTM A123/A123M, at 1.7 ounces per square foot.

B. Hardware: Hot-dip galvanized to weight required by ASTM A153/A153M.

C. Accessories: Same finish as framing.

PART 3 EXECUTION

3.01 INSTALLATION

A. General Installation: Install framework, fabric, accessories and gates in accordance with ASTM F567. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.

B. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567.

C. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.

D. Post Setting: Hand-excavate holes for post foundations in firm, undisturbed or compacted soil. Set terminal and gate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Using mechanical devices to set posts per ASTM F567 is not premitted. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during placement and finishing operations until concrete is sufficiently cured.

E. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F567 and terminal pull posts at changes in horizontal or vertical alignment.

F. Line Posts: Space line posts uniformly at 8 feet O.C.

G. Intermediate Rails: Install in one piece at post-height center span, spanning between posts, using fittings, special offset fittings, and accessories.

H. Chain-Link Fabric: Place fabric on outside of posts and rails.
   1. Position bottom of fabric 2 inches above concrete or asph.
   2. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.
   3. Do not stretch fabric until concrete foundation has cured 28 days.
   4. Install bottom tension wire stretched taut between terminal posts.

I. Provide a minimum of six (6) ties for each ten feet (10') of rail and one (1) tie to each foot of post height. Ties to tension wire shall be made with heavy galvanized hog rings at six (6) per ten feet (10') of tension wire.

J. Tension bands: provide one (1) fastener for each one foot (1') of fabric height (minimum of 8 bands for 10 ft., 3 bands for 42”).

K. Set terminal and gate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.

L. Line Post Footing Depth Below Finish Grade: ASTM F567.

M. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567.

N. Brace each gate and corner post to adjacent line post with horizontal center brace rail. Install brace rail one bay from end and gate posts.

O. Do not stretch fabric until concrete foundation has cured 28 days.

P. Position bottom of fabric 2 inches above concrete mowstrip.

Q. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

R. Do not attach the hinged side of gate to building wall; provide gate posts.

3.02 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Position: 1 inch.

3.03 FIELD QUALITY CONTROL

A. Layout: Verify that fence installation markings are accurate to design, paying attention to gate locations, underground utilities, and property lines.

B. Gates: Inspect for level, plumb, and alignment.

3.04 CLEANING

A. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.

B. Clean fence with mild household detergent and clean water rinse well.

C. Remove mortar from exposed posts and other fencing material using a 10 percent solution of muriatic acid followed immediately by several rinses with clean water.

D. Touch up scratched surfaces using materials recommended by manufacturer. Match touched-up paint color to factory-applied finish.

3.05 CLOSEOUT ACTIVITIES

A. Demonstrate proper operation of equipment to Owner's designated representative.

END OF SECTION 32 3113